

PART I

ADDENDUM PAGES

12/1/06

DEPARTMENT OF UTILITIES

CHESTERFIELD COUNTY, VIRGINIA

PROCEDURE FOR ESTIMATING CUSTOMER WATER DEMAND

Owner's Engineer or authorized agent shall:

1. Determine the number and type of water fixtures needed and list on the "Sizing Water Service Lines and Meters" form where applicable (Attachment A).
2. Determine the combined fixture value: Multiply the fixture values times the number of fixtures to obtain the Total Fixture Value for each type of fixture. Add all Total Fixture Values and place the answer on the Combined Fixture Value Total Line.
3. Substantiate all other demands with data furnished by the owner's engineer and/or his agent. If it is necessary to have a fixed demand and/or an irrigation demand, owner's engineer and/or his agent must complete Part B of the sizing form.

**Caution:** The person completing Part B of this form needs to include all water demands necessary for the buildings and/or its' intended use. For conversion from Combined Fixture Value to gpm, refer to Figures 4.2 and 4.3 of the AWWA Manual of Water Supply Practices No. M 22, latest revision.

4. Upon completion of this form, send to the following address:

Chesterfield County Department of Utilities  
Development Section  
P.O. Box 608  
Chesterfield, Virginia 23832-0009

County shall determine:

1. If you install water saving flush valve water closets, the County's virtual meter policy may apply.
2. County will size the service based on the information provided by the Owner's Engineer or authorized agent.

Business Name:	Address of Building:	
Development Name:	Project Number	Type of Use _____ Map I.D. No. _____
<b>I certify that the information on this form is true and correct.</b> <b>Applicant Name</b> (Print) _____ <b>Phone #</b> _____ (Signature) _____ <b>(Local Phone # Desired)</b>		

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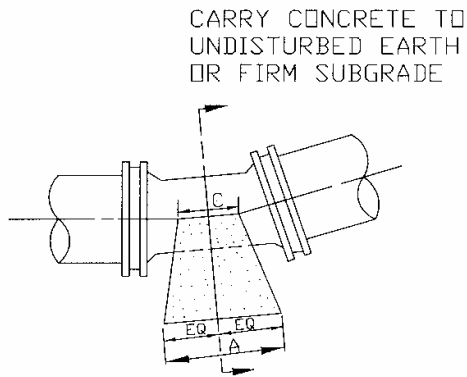
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PART II

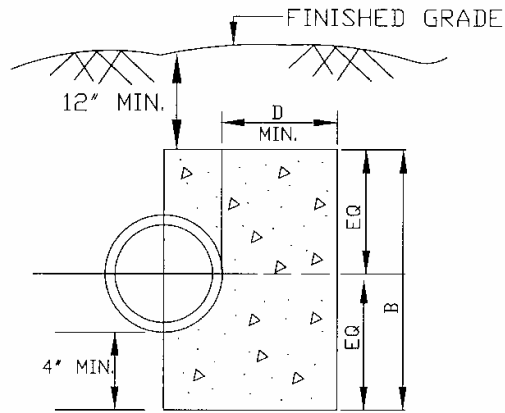
ADDENDUM PAGES

12/1/06

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



PLAN



SECTION

PIPE SIZE	11 1/4° BEND				22 1/2° BEND				45° BEND				90° BEND			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
4"	6"	1'-0"	4"	6"	8"	1'-0"	6"	7"	1'-1"	1'-0"	6"	6"	1'-10"	1'-0"	6"	1'-0"
6"	8"	1'-2"	6"	7"	10"	1'-2"	6"	8"	1'-4"	1'-2"	6"	8"	2'-3"	1'-2"	6"	1'-6"
8"	8"	1'-4"	8"	7"	1'-4"	1'-4"	8"	8"	2'-0"	1'-4"	8"	9"	3'-3"	1'-4"	8"	1'-6"
10"	1'-1"	1'-6"	8"	8"	1'-7"	1'-6"	8"	10"	2'-6"	1'-6"	8"	10"	3'-9"	2'-0"	10"	1'-6"
12"	1'-4"	1'-8"	1'-0"	9"	2'-0"	1'-8"	1'-0"	1'-0"	3'-3"	1'-8"	1'-0"	1'-0"	5'-0"	2'-0"	10"	1'-6"
16"	1'-9"	2'-0"	1'-0"	9"	2'-6"	2'-0"	1'-0"	1'-3"	4'-3"	2'-6"	1'-0"	1'-3"	6'-0"	2'-6"	1'-4"	1'-9"
18"	1'-9"	2'-6"	1'-0"	10"	3'-3"	2'-6"	1'-0"	1'-6"	6'-0"	2'-6"	1'-0"	1'-4"	8'-0"	3'-4"	1'-8"	1'-9"
20"	1'-9"	2'-6"	1'-0"	10"	3'-3"	2'-6"	1'-0"	1'-6"	6'-0"	2'-6"	1'-0"	1'-4"	8'-0"	3'-4"	1'-8"	1'-9"
24"	2'-0"	3'-0"	1'-0"	1'-0"	3'-9"	3'-0"	1'-0"	1'-6"	7'-0"	3'-0"	1'-0"	1'-9"	9'-9"	4'-0"	2'-0"	2'-0"
30"	2'-6"	3'-6"	1'-4"	1'-2"	4'-0"	3'-6"	1'-4"	1'-9"	7'-6"	4'-0"	1'-4"	2'-3"	9'-9"	5'-0"	2'-6"	2'-6"

NOTE:

- 1.) BLOCKING DIMENSIONS ARE SHOWN AT A MINIMUM.
- 2.) BLOCKING DIMENSIONS ARE BASED ON A STATIC PRESSURE OF 150 PSI AND AN ALLOWABLE SOIL BEARING CAPACITY OF 2000 PSF.
- 3.) WHERE SOIL BEARING CAPACITY IS LESS THAN OR GREATER THAN 2000 PSF, BLOCKING DESIGN CALCULATION ARE TO BE SHOWN ON THE PLANS.
- 4.) FITTINGS TO BE WRAP IN 4 MIL POLYETHYLENE TO PROTECT NUTS, BOLTS, OR OTHER.

DATE  
JAN. 1996

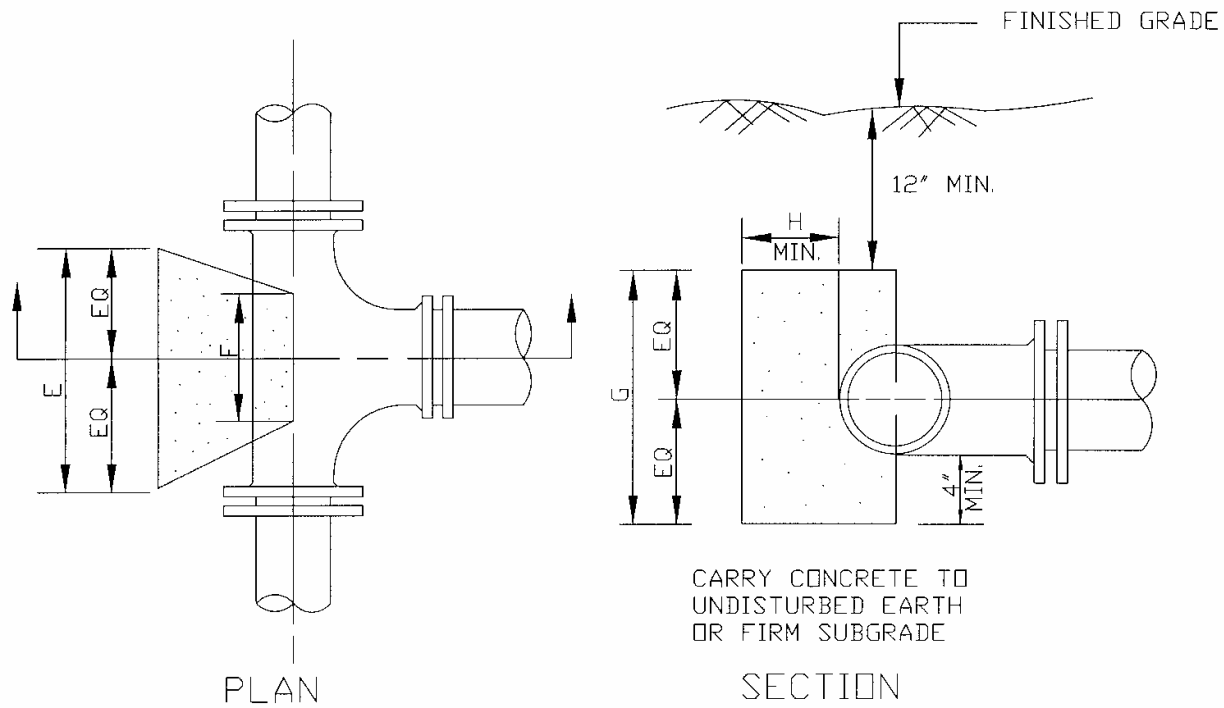
REVISIONS  
NOV. 2006

## BLOCKING DETAIL HORIZONTAL BENDS

DRWG. NO.

BLK-1

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



BRANCH SIZE	E	F	G	H
4"	1'-0"	8"	1'-4"	6"
6"	1'-4"	1'-0"	1'-8"	8"
8"	1'-6"	1'-0"	2'-6"	9"
10"	2'-2"	1'-0"	2'-8"	10"
12"	2'-6"	1'-0"	3'-6"	1'-0"
16"	3'-4"	1'-4"	4'-8"	1'-2"
18"	4'-0"	2'-0"	6'-0"	1'-6"
20"	4'-0"	2'-0"	6'-0"	1'-6"
24"	5'-0"	2'-0"	6'-8"	1'-8"
30"	5'-6"	2'-6"	7'-0"	1'-10"

**NOTE:**  
SEE APPLICABLE  
NOTES AS SHOWN  
ON BLK-1.

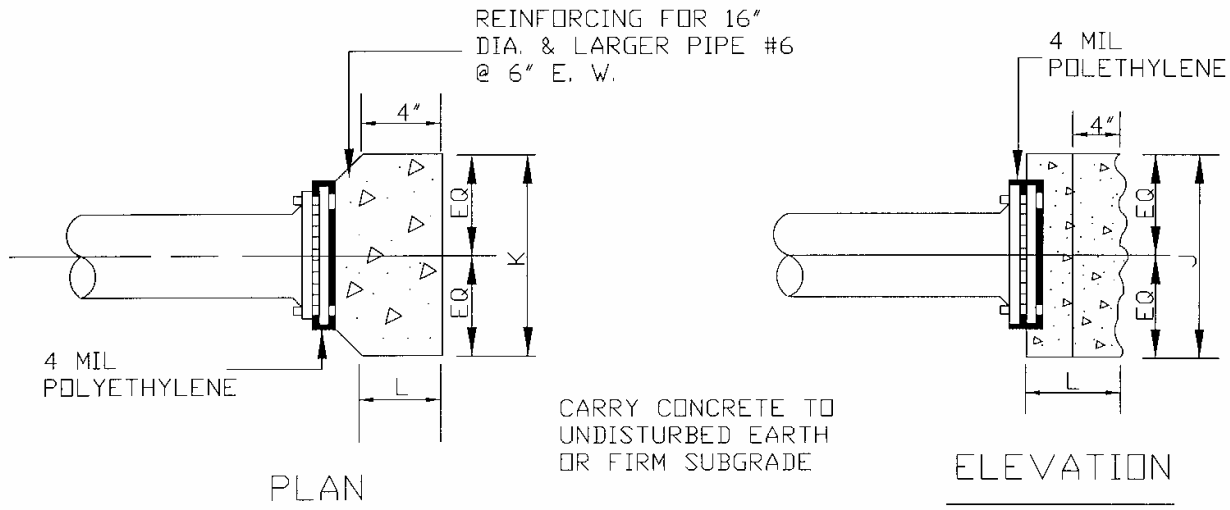
DATE  
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## BLOCKING DETAIL-TEES

DRWG. NO.  
BLK-2

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



SIZE	J	K	L
4"	1'-0"	1'-0"	8"
6"	1'-6"	1'-6"	8"
8"	2'-6"	1'-6"	10"
10"	2'-8"	2'-2"	1'-0"
12"	3'-6"	2'-6"	1'-2"
16"	4'-8"	3'-4"	1'-4"
18"	6'-0"	4'-0"	1'-6"
20"	6'-0"	4'-0"	1'-6"
24"	6'-8"	5'-0"	1'-8"
30"	8'-0"	6'-8"	2'-0"

NOTE:  
SEE APPLICABLE  
NOTES AS SHOWN  
ON BLK-1.

NOTE: BLOCKING BASED ON PRESSURE OF 150 P.S.I. AND  
ALLOWABLE SOIL BEARING CAPACITY OF 2000 P.S.F.  
CONCRETE TO BE 3000 P.S.I.

DATE  
JAN. 1996

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NOV. 2006

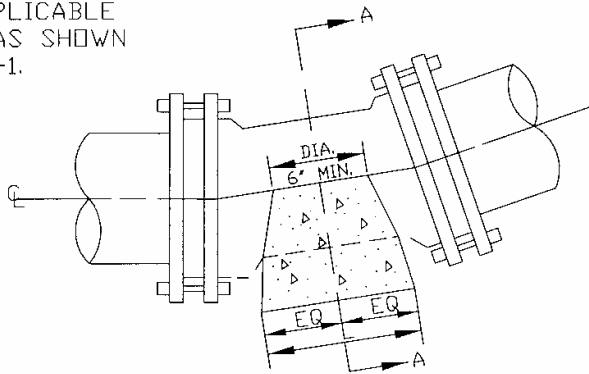
## BLOCKING DETAIL PLUGS, CAPS, AND HYDRANTS

DRWG. NO.

BLK-3

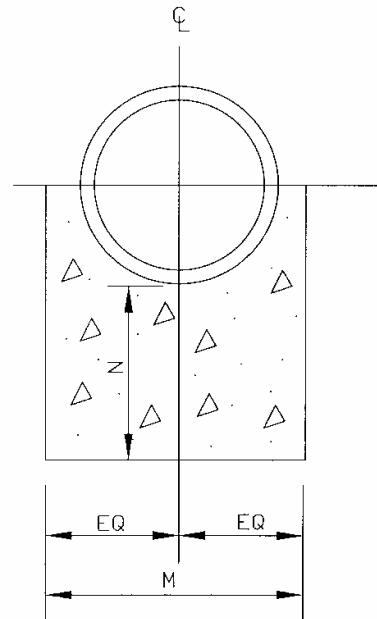
# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

NOTE:  
SEE APPLICABLE  
NOTES AS SHOWN  
ON BLK-1.



ELEVATION

CARRY CONCRETE TO  
UNDISTURBED EARTH  
OR FIRM SUBGRADE.



SECTION A-A

PIPE	11-1/4° BEND			22-1/2° BEND			45° BEND		
SIZE	L	M	N	L	M	N	L	M	N
6"	6"	1'-2"	8"	10"	1'-2"	8"	1'-2"	1'-2"	8"
8"	8"	1'-4"	8"	11"	1'-4"	8"	1'-9"	1'-4"	8"
10"	8"	1'-6"	8"	1'-3"	1'-6"	9"	2'-5"	1'-6"	1'-0"
12"	8"	2'-0"	8"	1'-4"	2'-0"	9"	2'-8"	2'-0"	1'-2"
16"	1'-1"	2'-4"	9"	2'-1"	2'-4"	1'-0"	4'-0"	2'-4"	1'-6"
18"	1'-5"	2'-8"	10"	2'-9"	2'-8"	1'-2"	5'-6"	2'-8"	2'-0"
20"	1'-5"	2'-8"	10"	2'-9"	2'-8"	1'-2"	5'-6"	2'-8"	2'-0"
24"	1'-10"	3'-0"	1'-0"	3'-7"	3'-0"	1'-4"	6'-0"	3'-6"	2'-6"
30"	2'-00"	3'-6"	1'-2"	3'-11"	3'-6"	1'-6"	6'-6"	3'-10"	2'-9"

NOTE: BLOCKING BASED ON PRESSURE OF 150 PSI AND ALLOWABLE SOIL  
BEARING CAPACITY OF 2000 PSF. CONCRETE TO BE 3000 PSI.

DATE  
JAN. 1996

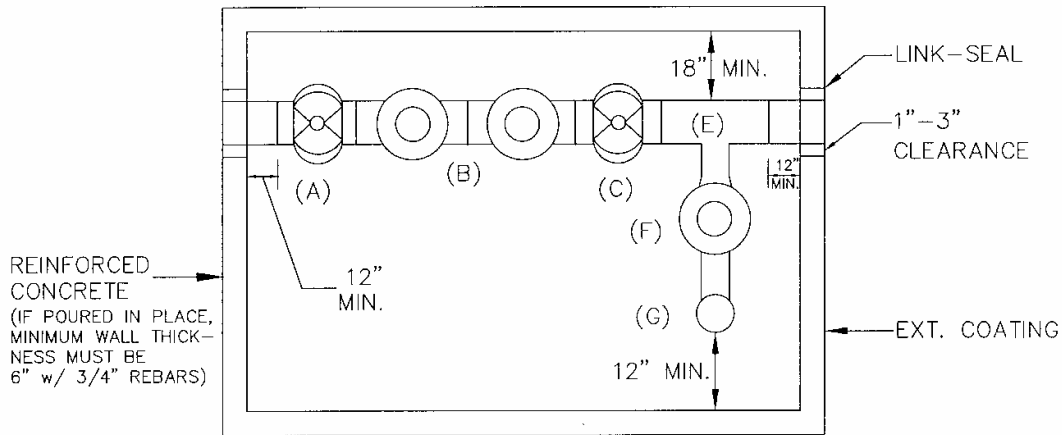
REVISIONS  
NOV. 2006

## BLOCKING DETAIL LOWER VERTICAL BENDS

DRWG. NO.  
BLK-4

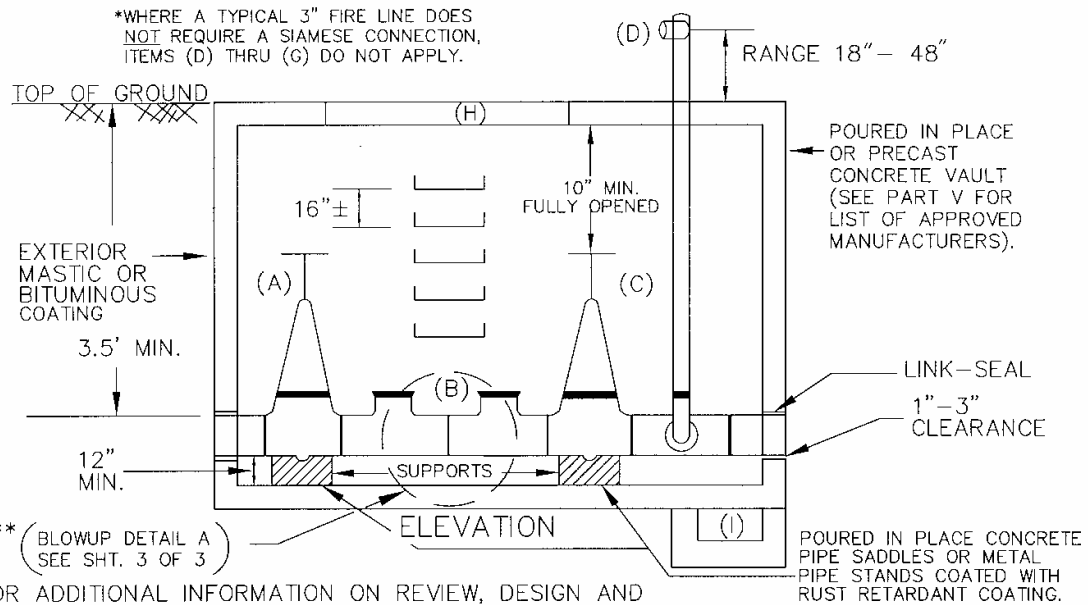


# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



PLAN

- (A) OUTSIDE STEM AND YOKE GATE VALVE
- (B) DOUBLE CHECK VALVE ASSEMBLY
- (C) OUTSIDE STEM AND YOKE GATE VALVE
- \* (D) 2 1/2" THREADED N.S.T. SIAMESE CONNECTION FOR FIRE DEPARTMENT W/AUTOMATIC BALL DRIP
- \* (E) REQUIRED (MAIN LINE SIZE) " X 4"
- \* (F) 4" CHECK VALVE
- \* (G) 4" - 90° BEND
- (H) JD-2AL 4' X 4' BILCO DOOR, OR APPROVED EQUAL.
- (I) SUMP WHERE WATER TABLE IS A PROBLEM OR GRAVITY DRAIN WHERE WATER TABLE IS NOT A PROBLEM.
- \*\* (J) BYPASS LINE W/DETECTOR METER & BACKFLOW PREVENTER



FOR ADDITIONAL INFORMATION ON REVIEW, DESIGN AND CONSTRUCTION, SEE PART IV, & PART V OF THE SPECIFICATIONS.

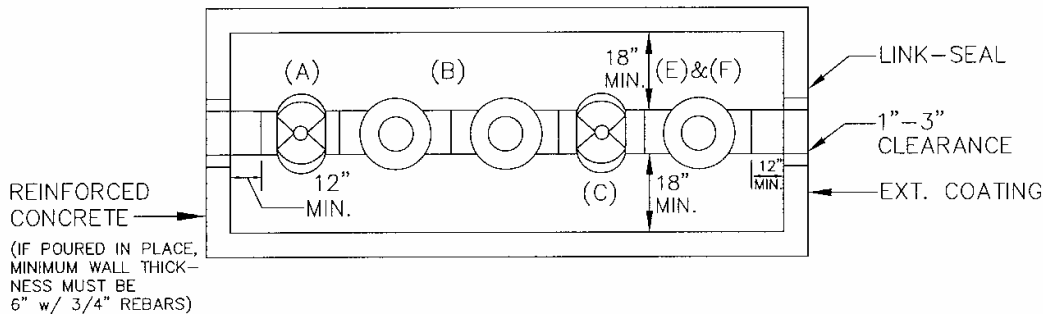
DATE:  
JAN. 1996

REVISIONS:  
NOV. 2006

3" OR LARGER  
DOUBLE CHECK ASSEMBLY AND VAULT  
(Alternate 1)

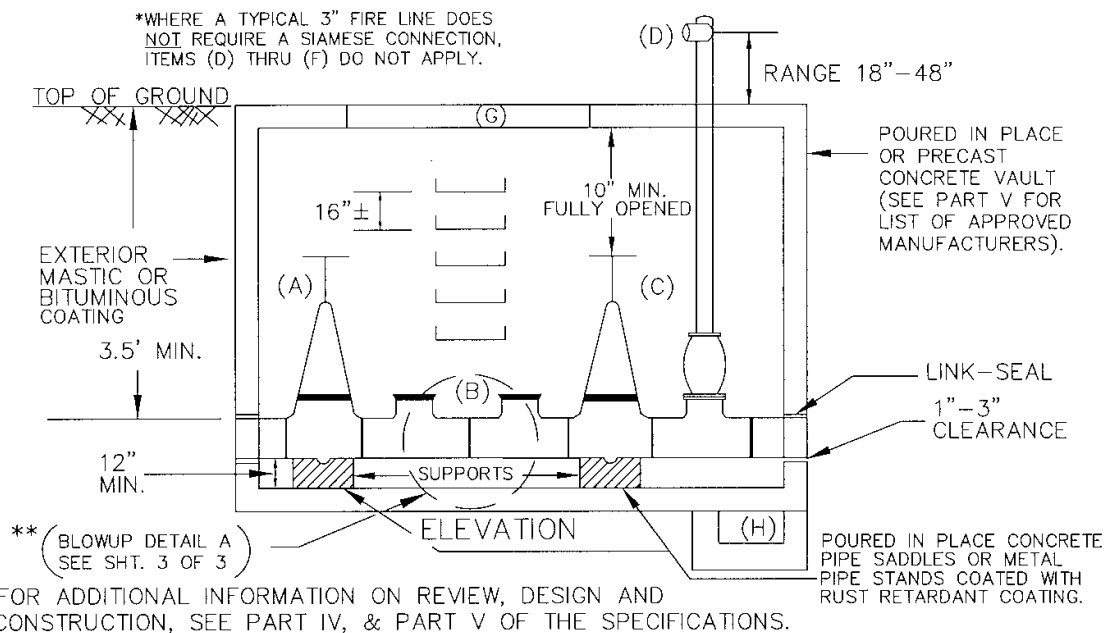
DRWG. NO.  
FIR-3  
SHT. 1 OF 3

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



## PLAN

- (A) OUTSIDE STEM AND YOKE GATE VALVE
- (B) DOUBLE CHECK VALVE ASSEMBLY
- (C) OUTSIDE STEM AND YOKE GATE VALVE
- \* (D) 2 1/2" THREADED N.S.T. SIAMESE CONNECTION FOR FIRE DEPARTMENT W/AUTOMATIC BALL DRIP
- \* (E) REQUIRED (MAIN LINE SIZE) " X 4"
- \* (F) 4" FIRE PROTECTION CHECK VALVE - Fig. 590F AS MANUFACTURED BY GROOVED SPRINKLER CO. OR APPROVED EQUAL FOR USE IN THIS SPECIFIC APPLICATION.
- (G) JD-2AL 4' X 4' BILCO DOOR, OR APPROVED EQUAL.
- (H) SUMP WHERE WATER TABLE IS A PROBLEM OR GRAVITY DRAIN WHERE WATER TABLE IS NOT A PROBLEM.
- \*\* (I) BYPASS LINE W/DETECTOR METER & BACKFLOW PREVENTER



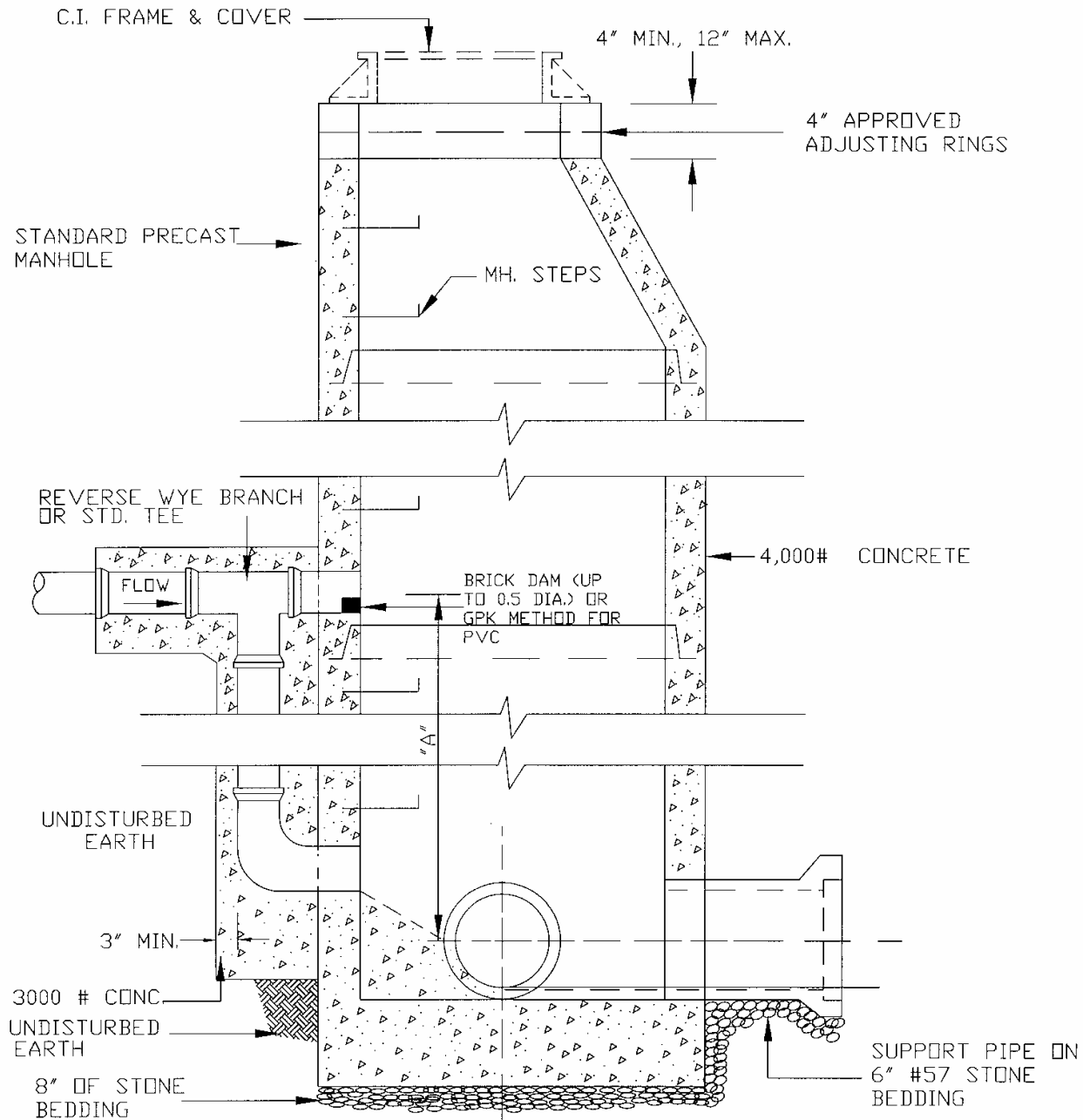
DATE:  
MARCH 2002

REVISIONS:  
NOV. 2006

3" OR LARGER  
DOUBLE CHECK ASSEMBLY AND VAULT  
(Alternate 2)

DRWG. NO.  
FIR-3  
SHT. 2 OF 3

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



**NOTE:** WHERE "A" IS GREATER THAN 2'-0" USE STANDARD DROP CONNECTION. CONCRETE ENCASEMENT MAY BE ELIMINATED IF DUCTILE IRON PIPE AND FITTING ARE USED FOR DROP CONNECTION.

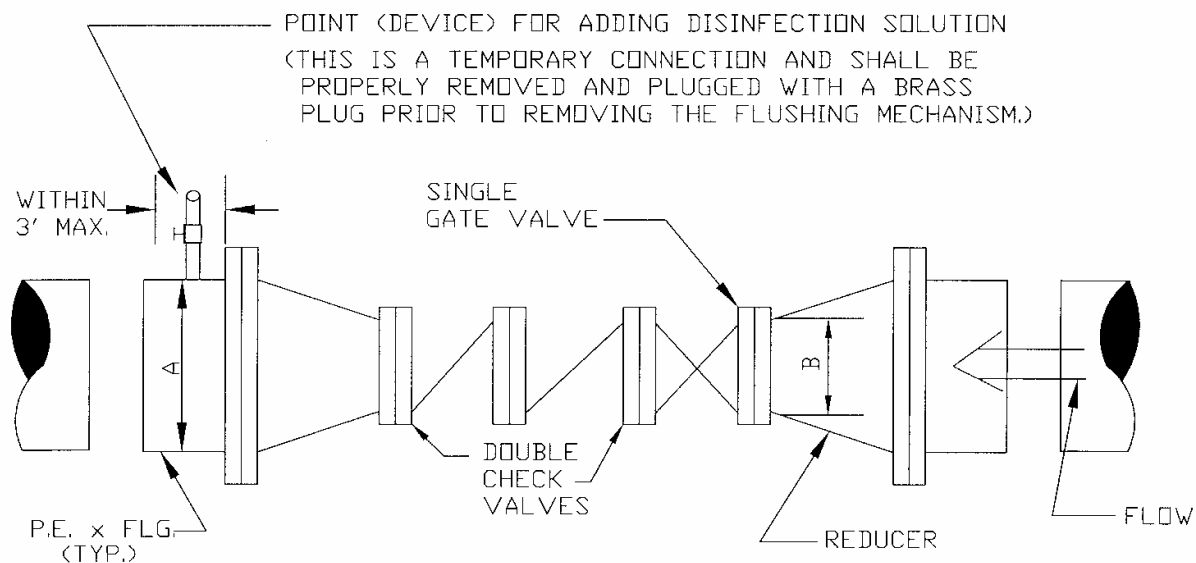
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## STANDARD DROP CONNECTION

DRWG. NO.  
MAN-10

# CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



A	B
6"	4"
8"	4"
12"	6"
16"	6"
20"	8"
24"	12"
30"	12"
36"	*

A = MAIN SIZE

B = CHECKVALVE AND GATE VALVE SIZE

\* = TO BE DESIGNED BY CONSULTANT.

NOTE: CONTRACTOR SHALL USE IN ACCORDANCE WITH FLUSHING SCHEDULE; SEE PART III & IV (SECTIONS ENTITLED "DISINFECTION SYSTEM" AND "SUPPLEMENTAL PROCEDURES FOR DISINFECTING, TESTING, AND FLUSHING") AND TABLE 1 ENTITLED "FLUSHING SCHEDULE."

DATE  
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## PREASSEMBLED FLUSHING MECHANISM

DRWG. NO.  
WAT-6

## PART III

### ADDENDUM PAGES

12/1/06

**PART III**

**COUNTY**

**WATER AND SEWER PROJECT**

**CONSTRUCTION SPECIFICATIONS**

**CHESTERFIELD COUNTY, VIRGINIA**

**INSTRUCTIONS for viewing and/or printing this document:**

To view PART III, click on the blue highlighted area above. After pulling up PART III, click on “**BOOKMARKS**” in the left hand margin of the document to locate various sections within the document. To print the document in its entirety, click FILE – PRINT. (When printing the document, please remember to print this table of contents and include it in your book.)

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10. **SUBCONTRACTORS.** The Bidder's attention is called to the requirement that not more than fifty (50) percent of the work shall be subcontracted. The amount of any subcontract proposed by any bidder shall be provided to the County upon request.
11. **RESTORATION OF PRIVATE PROPERTY.** On those projects where work is to be performed on private property, the County has obtained easements. The standard easement agreement states that any structures, landscaping (except for trees, limbs and undergrowth) and the surface of the easement shall be repaired or restored as nearly as possible to their original conditions. Any special requirements for restoration shall be shown on the plans or as directed by the inspector.
12. **ACCEPTANCE OF BID AND ITS EFFECT.** The Contract, if awarded, will be to the lowest responsible Bidder whose Bid complied with the requirements of the Owner. The Owner will either award the project or reject all Bids received within sixty (60) days after the formal opening of Bids. The acceptance of a Bid will be a written Notice of Award, signed by the Owner, and no other act shall constitute the acceptance of a Bid. The bid shall be deemed accepted by the County upon mailing of the Notice of Award.
- The successful Bidder shall execute four (4) copies of the Agreement and furnish satisfactory Performance Bond, Labor and Material Payment Bond, and necessary certificates of insurance within fifteen (15) days after Notice of Award. Failure to so execute the Agreement will result in forfeiture of the Bidder's claim to the work and his Bid Bond or guarantee will be retained by the Owner to the extent necessary to make up the difference between the Bid and the second low bid.
13. **BID AMOUNT.** If the bid from the lowest responsible bidder exceeds available funds, the Owner may negotiate with the low bidder to obtain a contract price within available funds.
14. **DISABILITY PROVISION.** If you are an individual with a disability and require a reasonable accommodation, please notify the Chesterfield County Purchasing Department at (804) 748-1617, three working days prior to need.

Before a tie-in will be allowed, all new valves, including fire hydrant valves, shall be accessible and verified fully open by the Contractor, unless there are valves designated as "normally closed". Prior to tie-in, the Inspector shall verify that all valves, including fire hydrant valves, are fully open and accessible. Immediately after a tie-in has been made, all valves used during the shutdown shall be verified fully open by the Inspector. All fire hydrants shall be checked by the Inspector to ensure water is available and each hydrant is in working order.

#### **59. PROCEDURES FOR CLAIMS AND DISPUTES**

A claim is a demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. Claims must be initiated by written notice. The responsibility to substantiate claims shall rest with the Contractor.

Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such claim or within 21 days after the claimant first recognizes the condition giving rise to the claim, whichever is later. Claims must be initiated by written note to the Architect or Engineer and Owner. Submittal of a claim by the Contractor within the time limits prescribed by this paragraph shall be required as a condition precedent to the institution of litigation by the Contractor with respect to the subject matter of that claim.

#### **64. PROGRESS MEETINGS**

Contractor shall hold a progress meeting at a time, date and frequency set forth in the pre-construction meeting to review progress to date and resolve all questions for the upcoming progress meeting. Engineer is responsible for the preparation of the progress meeting agenda and minutes. Engineer will forward progress meeting agenda to the Contractor for any additions to agenda.

**NOTICE TO PROCEED**

DATE

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Re: Project Number \_\_\_\_\_  
Project Name \_\_\_\_\_

Dear \_\_\_\_\_:

You are hereby notified to commence WORK in accordance with the Agreement dated \_\_\_\_\_, 20\_\_\_\_\_, within ten (10) calendar days from the date of this letter, and you are to complete the WORK within \_\_\_\_\_ consecutive calendar days after the 10 day commencement period. The date of the completion of all work is \_\_\_\_\_.

Prior to commencing work on \_\_\_\_\_, you are required to schedule a pre-construction meeting. This meeting may be scheduled by contacting the Utilities Department Construction Section at 796-7125.

Please acknowledge and return a copy of this Notice to Proceed within five (5) days from the date of this letter.

COUNTY OF CHESTERFIELD

By \_\_\_\_\_

Title \_\_\_\_\_

**ACCEPTANCE OF NOTICE**

Receipt of the above NOTICE TO

PROCEED is hereby acknowledged by

\_\_\_\_\_  
this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

COUNTY NO. \_\_\_\_\_

### 3.02 TESTING OF WATER DISTRIBUTION SYSTEM

#### A. Testing Techniques for Water Distribution System:

1. Each properly isolated section of the piping system including all water services shall be subjected to a pressure test of 150 psi or 1½ times the working pressure, whichever is greater, measured at the high point of the system. Maintain this pressure for a minimum of two hours with an allowable leakage as reflected in the Standard Details Section, Part II. Prior to applying pressure to the lines all reaction blocking, and/or mechanical restraint shall have been completed to the satisfaction of the Engineer or Inspector. As the pipes are being filled, all air shall be expelled from the pipes by providing suitable taps at the high points of the system. After the system is filled, all taps shall be tightly plugged. Any defects discovered during this test shall be corrected as directed and the test shall be repeated until the results are satisfactory. The Contractor shall provide all equipment and materials and perform all labor necessary to conduct the test in the prescribed manner. The Contractor shall provide a suitable test pump and properly calibrated gauge or other means for measuring leakage to include, a clean 50 gallon barrel with top cut out which is satisfactory to the Engineer or Inspector.
2. The Owner will furnish water for flushing, sterilization and testing without charge. Filling of water line may be performed provided permission has been obtained from the Inspector who will be responsible for coordinating this activity with the County's Operations and Maintenance Section. Contractor is not permitted to operate valves on existing lines.
3. Testing shall be performed in accordance with the AWWA Specifications, latest edition.

### 3.03 DISINFECTION

- #### A.
- Prior to being placed in service, the pipe line and appurtenances shall be disinfected in general accordance with ANSI/AWWA C651-05; AWWA Standard for **Disinfecting Water Mains** and the supplemental procedures as set forth below.

The Contractor or his subcontractors shall be familiar with the procedures and equipment required for disinfecting large diameter water mains. As part of the submittal process the Contractor shall be required to submit a disinfection plan to the Engineer for approval. At a minimum, the Contractor's plan shall address the following:

- Description of chlorination procedure
  - Method of chlorination
  - Method of neutralizing chlorinated water
  - Method of controlling discharge water such that damage from erosion and flooding is prevented.
1. Section 4 of AWWA C651-05 emphasizes six basic procedures in the disinfection process. The procedures are to:
    - a. prevent contaminating materials from entering the water main during storage, construction, or repair;
    - b. remove, by flushing or other means, those materials that may have entered the water main;
    - c. chlorinate any residual contamination that may remain, and flush the chlorinated water from the main;
    - d. protect the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures;
    - e. determine the bacteriological quality by laboratory test after disinfection; and
    - f. make final connection of the approved new water main to the active distribution system.
  2. Preliminary Flushing:

The main shall be flushed prior to disinfection at a velocity of not less than 2.5 Ft./Sec. unless the owner determines that conditions will not permit the required flow. See Table 1, entitled "Flushing Schedule". Adequate provisions shall be made by the contractor for disposal of flushing water so that no physical or environmental damage results. Contractor will find additional instructions on flushing in the supplemental procedures within this section.
  3. Forms of Chlorine for Disinfection:

It is the contractor's responsibility to be familiar with and have available for his employees the "Product Data Safety Sheets" of any products used as a source of chlorine and to provide the proper safety instructions and personal protective equipment to the employees mixing and using materials for disinfection of the water facilities.

    - a. Acceptable sources of chlorine for disinfection may be obtained from any of the following three sources:



- 1) Liquid sodium hypochlorite (household bleach)
  - 2) Liquid sodium hypochlorite (industrial strength)
  - 3) Calcium hypochlorite granules
- b. Only under extreme conditions and with the written approval of the Owner and under the direction of a holder of a State of Virginia Class III (or higher) water works operator's license can chlorine gas, regulated through proper metering equipment, be mixed with water to obtain a suitable disinfecting solution.
- c. The direct introduction of chlorine gas (or liquid) from a pressure cylinder into a water line is not safe and shall not be allowed.
- d. The use of calcium hypochlorite pills affixed to the interior of water pipe for disinfection shall not be an acceptable form of disinfection.
- e. The mixing of a source of chlorine to obtain a suitable disinfecting solution shall be as follows:
- 1) Liquid sodium hypochlorite is supplied in strengths from 5.25 percent available chlorine (commercially available household bleach) to 15 percent available chlorine (industrial strength sodium hypochlorite). A water-sodium hypochlorite solution shall be prepared by adding liquid sodium hypochlorite to water.
  - 2) A water calcium hypochlorite solution shall be prepared by dissolving calcium hypochlorite granules containing 65% available chlorine by weight in a pre-determined volume of water to make the desired water-calcium hypochlorite concentration. Disinfection of new mains by water calcium hypochlorite solution shall not be used unless a suction or in-line strainer is available on the solution pump to prevent any undissolved solids from entering the piping. An alternative method of straining the solution to remove undissolved granules may be approved by the inspector on a case by case basis.

- 3) A water-chlorine gas solution may be used only when suitable equipment is available and shall be done under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who has a State of Virginia Class III or above water works operator's license and is properly trained and equipped to handle any emergency that may arise.
- 4) The direct introduction of chlorine gas (or liquid) from a pressure cylinder into a water line is not safe and shall not be allowed.

4. Method of Chlorine Application and Testing:

- a. The continuous feed method of applying the disinfecting solution shall be as follows: Water from the existing distribution system or other approved sources of potable water supply shall flow through an approved flushing mechanism (Standard Detail WAT-6) at a constant, measured rate into the newly-laid pipeline. The water shall be mixed with a chlorine-water solution as prepared above, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration of the water and water/chlorine solution in the pipe is elevated to and maintained at, a minimum of 50 mg/l available chlorine.

Since the forms of preparation for a water sodium hypochlorite or water calcium hypochlorite concentration are a batch process, a method acceptable to the inspector shall be available to replenish the concentration being fed and mixed with the water flow, so there is no interruption of the flow of disinfection solution.

To assure that this concentration is maintained, the chlorine residual shall be measured at intervals not exceeding 2,000 feet and at the end of all branch lines or cul-de-sacs in accordance with the procedures outlined herein. During the application of the chlorine-water solution, valves, hydrants and any other appurtenances shall be operated in order to be thoroughly disinfected. Chlorine-water solution application shall continue until the entire new main is filled with water having a residual of a minimum of 50 mg/l chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours.

- b. For 36" and larger water lines: Disinfection by the slug method shall be in accordance with AWWA C-651-05, Section 4.4.4.3. A preassembled flushing mechanism shall be used between the supply and the process equipment and the chlorinated main at all times.
- c. The Owner will furnish the personnel and equipment for determining water-chlorine solution strengths and residuals.
- d. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine residual of the water leaving the main is equal to the chlorine residual of the incoming system water. At that time, the new system shall be valued off and bacteriological testing shall begin as indicated in Section 3.03.B. Additional instructions for disposal of the heavily chlorinated water is covered in Section 3.04.E, entitled "Flushing".

B. Bacteriological Tests:

- 1. After final flushing, and before the water main is placed in service, samples shall be collected and tested for bacteriological quality as follows:
  - a. If total chlorine is 1.5 mg/L or less: Begin bacteriological testing at 24 hours after final flush.
    - 1) Test for total and fecal coliform for 2 consecutive days. Both test samples must be less than 1 colony/100 ml.
    - 2) Test for heterotrophic plate count on 2nd day. Test sample must be less than 500 colonies/ml.
  - b. If total chlorine is greater than 1.5 mg/l: Wait 5 days or until residual drops to 1.5 mg/l or less, whichever is sooner, then test.
    - 1) Test for total and fecal coliform for 2 consecutive days. Both test samples must be less than 1 colony/100 ml.
    - 2) Test for heterotrophic plate count on 2nd day. Test sample must be less than 500 colonies/ml.

Samples shall be collected at least 24 hours apart at intervals determined by the Inspector (not exceeding 2,000 feet apart and at the end of all branch lines and cul-de-sacs) and tested by the County of Chesterfield laboratory and the results submitted to the Owner.

2. Samples for bacteriological analysis shall be collected in approved sterile bottles or bags treated with sodium thiosulfate provided by the County laboratory. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory and disinfection shall be repeated as prescribed above until the samples are satisfactory. Cleaning, disinfection and testing shall be under the direction of the Inspector but remains the responsibility of the Contractor. Water for these operations will be furnished by the Owner, but the Contractor shall be responsible for any cost associated with the loading, hauling, and discharging of the heavily chlorinated water.

### **3.04 SUPPLEMENTAL PROCEDURES FOR DISINFECTING, TESTING, AND FLUSHING**

#### **A. GENERAL:**

1. All work shall be performed in general accordance with AWWA C651-92.
2. The supplemental procedures are developed to compliment the AWWA C651-92 Standard, particularly with respect to flushing, testing and tie-in to the existing water distribution system.
3. These procedures and construction acceptance for final tie-in of a new water main are performance based, predicated on the new construction passing pressure and bacteriological testing. In order to best assure satisfactory bacteriological results, it is essential that all aforementioned preventive and precautionary measures be taken prior to and during construction to protect the interiors of pipe, fittings and valves against contamination. Failure to follow the precautionary measures increases the likelihood of unsatisfactory bacteriological tests and increases the construction requirements necessary for final acceptance. Refer to AWWA C651-92, Section 4, entitled "Preventive and Corrective Measures During Construction".

4. No contaminated material or any material capable of supporting the growth of microorganisms or causing taste, odor, or other aesthetic water quality concerns shall be used in sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation or sealing gaskets shall be Blue Lube or Slikstyx pipe gasket lubricant. Blue Lube and Slikstyx are the only pipe joint lubricant for such use. It shall be kept clean and applied clean with dedicated applicators. (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)
5. Table 1, Flushing Schedule gives flushing flow rates and flushing mechanism sizes for water mains 6" through 24" in diameter. Specific flushing schedules for line sizes above 24" will be project and site specific and directions will be given on the project drawings.

B. Filling and Testing Procedures:

1. Connection of the new water main to the existing distribution system for filling and testing shall be through a contractor furnished flushing mechanism as shown on Standard Detail WAT-6 of these specifications and sized as noted in Table 1, entitled "Flushing Schedule". The contractor is to furnish the single gate valve, double check valve flushing assembly and all necessary fittings, reducers, increases and sleeves to make the piping connections. A suitable valued piping arrangement for the additions of the water-chlorine solution is to be available on the new line side of the flushing assembly. The assembly is to be furnished with 125 psi rated flange connections and installed in a manner approved by the Inspector.
2. Initial flush time is to be in accordance with Table 1, entitled "Flushing Schedule".
3. Pressure test the line as noted in Section 3.02, A.1 of these specifications.
4. Make any necessary repairs and pressure test again until the line passes this test.

5. Disinfect the line in accordance with AWWA C651-92, Section 5. A water-chlorine solution prepared in accordance with Section 3.03 A.3 above shall be used for disinfection.
  6. Bacteriological samples will be taken by the County in accordance with AWWA C651-92, Section 7.
  7. If unsatisfactory bacteriological test results are received, repeat steps 2, 5 and 6. Where only an unsatisfactory heterotrophic plate count is received, steps 2 and 6 need only be repeated at existing residuals.
  8. After receiving satisfactory bacteriological test results, the contractor shall coordinate with the Inspector the connecting of the new main to the existing system. All connecting pipe and fittings shall be clean and free of debris and shall be swabbed or sprayed with a 1 percent sodium hypochlorite solution before they are installed. The contractor shall tie-in new water lines to the existing water system within 10 working days of successful completion of all bacteriological tests, otherwise the disinfection process must be repeated.
  9. Final flush of line to be in accordance with Table 1, entitled "Flushing Schedule".
- C. The Disinfection and Supplemental Procedures as covered in sections 3.03 and 3.04 may be modified by the Director of Utilities for site specific problems that do not physically allow for following the normal disinfection procedures. Modified instructions will be given in writing from the Director through the Inspector and will be executed by the Contractor in a manner that does not subject the existing distribution system to undue problems and assures that adequate disinfection and flushing will be given to the new main.
- D. The procedure for the disinfection of short leads to fire hydrants and the connector pipe to fire suppression systems/ double check assemblies shall be as follows:
- Connector piping, fittings and valves from an existing main to a fire hydrant or to a fire system double check assembly, which does not contain domestic use branches and is equal to or less than eighteen (18) feet in length from the main, may be spray disinfected or swabbed with a minimum 1 percent solution of chlorine just prior to installation, tied-in and flushed at a velocity of not less than 2.5 ft/sec. Bacteriological sampling will be taken downstream for confirmation. Connections to existing mains must be done within 10 working days of the successful completion of all bacteriological tests; otherwise, the disinfection process shall be repeated.

E. Flushing:

Water for filling the line and flushing will be supplied by the Owner at no cost to the Contractor. Therefore, the use of water for making the new water line available for service will be as follows:

1. Initial Flush:

See Table 1, entitled "Flushing Schedule". This is to be a high velocity flush through all sections of the new line. Since the large volume of water may have effects on the existing distribution system, the initial flushing is to be done only with the approval of and under the direction of the Inspector. System demands may cause this flushing to be done at times when the existing distribution system demands are low.

Because of the large volume of water to be flushed from the fire hydrants or flushing hydrants, the Contractor must inspect the areas of discharge and provide the necessary equipment or materials to prevent any environmental damage or erosion. Sufficient hose length and termination fittings are to be provided so as to discharge the water into stable, heavily vegetated areas, drainage ponds, storm sewers, paved ditches, etc. The contractor is to be responsible for any damage that may result from flushing.

2. Flush to remove disinfecting solution:

This is a low velocity, low flow, flush through fire or flushing hydrants to remove the disinfecting solution from the new line. In new subdivisions, or in areas where there is an existing sanitary sewer, this discharge may be made into the sanitary sewer system. The Contractor is to provide sufficient hoses to connect from the hydrants to a manhole in a manner that provides a suitable air gap for backflow prevention. In projects where there are no sanitary sewers, the flushing of the disinfecting solution must not enter any streams or be discharged in a manner that causes any environmental damage. For site specific locations the Inspector may require the use of a neutralizing chemical and piping arrangement. (See drawing WAT-10, in Part II - "Standard Details" of these specifications). The expense of a neutralizing station is the responsibility of the Developer/Contractor. The Engineer shall indicate the need for a neutralizing station on the drawing.

### 3. Final Flush:

See Table 1, entitled "Flushing Schedule". The final flush is a medium velocity, medium flow flush to clear the line of any chlorine solution used in the tie-in and to provide for fresh water throughout the new lines.

TABLE 1

FLUSHING TABLE			
(Nominal) Main Size	Double Check Valve Single Gate Size (Note 1)	INITIAL FLUSH (Note 2)	FINAL FLUSH (Note 2)
		Min. Flow (gpm)	Max. Flow (gpm)
6"	4"	220	88
8"	4"	400	160
12"	6"	900	350
16"	6"	1500	624
20"	8"	2450	978
24"	12"	3525	1410
30"	Designed by Consultant	5505	2202
36"	Designed by Consultant	7935	3174

**NOTE:** 1) See description of "Preassembled Flushing Mechanism" Section II of the specifications, Detail WAT-6.

2) Approximation of flushing flows can be made by using either a pitot tube or a method of measuring the static discharge pressure from a hydrant used for discharge of the flushing water. See Section II of these specifications, WAT-9 "Discharge Table for Hydrants".

3) On a case by case basis, dependent upon such variables as length of new waterline (<200'); space limitations; or other unforeseeable obstacles, the inspector may authorize the use of a smaller flushing device if the use of this device will provide for adequate flushing of the new waterline.

### 3.05 ABANDONMENT OF WATER SERVICE

Excavate at the main and expose the corporation stop. Turn off the corporation stop and disconnect the copper tubing from the corporation stop. Assist the Inspector in referencing the location of the corporation stop for County records. Remove the meter box, yoke and service line. The Inspector will turn in the meter to the County's Utilities Operations and Maintenance Section. When existing water services are to be abandoned as a part of a utility project, the Utility Contractor shall review the scope of the work with the Utilities Inspector and then proceed to abandon those services prior to any other work commencing.

### 3.06 ABANDONMENT OF WATER MAINS

Water mains and hydrant laterals to be abandoned shall be permanently disconnected from the remaining system. If the abandonment takes place at a tee, the tee shall be removed from the main and straight pipe installed. For other instances involving fittings, the proper fitting shall be installed to eliminate the previous connection.



All open ends on abandoned pipe to be permanently sealed by plugging with masonry and/or mortar or plug. All valve boxes, fire hydrants, flushing hydrants blow-offs or other appurtenances to be removed. Salvageable fire hydrants are to be returned to the County's Utilities Operations & Maintenance Section.

### **3.07 CLEAN-UP**

Upon the completion of the installation of the water system and prior to the Owner's final acceptance, sediment and debris shall be removed from the system. The work area shall be restored to its original condition and pavement replaced to the satisfaction of VDOT and/or County.

End of Section

PART IV

ADDENDUM PAGES

12/1/06

**PART IV**  
**DEVELOPER**  
**WATER AND SEWER PROJECT**  
**CONSTRUCTION SPECIFICATIONS**  
**CHESTERFIELD COUNTY, VIRGINIA**

**INSTRUCTIONS for viewing and/or printing this document:**

PART IV is divided into three (3) sections – GENERAL CONDITIONS, TECHNICAL SPECIFICATIONS and APPENDICES. Each section has been set up with bookmarks making it more convenient to locate various topics within the document. After pulling up the section you wish to view or print, click on “BOOKMARKS” in the left hand margin of the document. (When printing the document, please remember to print this table of contents and include it in your book.)

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## GENERAL CONDITIONS

### 1. GENERAL:

- A. Construction will not be allowed to begin until all criteria of the design review process have been satisfied and permission has been granted by the County's Utilities Construction Section. If construction begins prior to permission being granted, the County reserves the right to require the contractor to uncover and/or remove unauthorized work.
- B. At the option of the Inspection Section, a pre-construction meeting may be required. Prior to beginning work, at least 48 hours advance notice must be given to the Inspection Section. Notification shall be given to the Chief Utilities Inspector at 748-1576.
- C. Where applicable, three copies of construction "cut-sheets" shall be submitted to the Utilities Department prior to the beginning of construction. "Cut-sheets" shall show centerline and offset hub elevations and amount of cut. Cut sheets are required on all gravity and force main wastewater projects, on water line projects where the final grade on future roads and paved areas can not be determined, and on projects where lines are installed in easements. Cut sheets are to be prepared by a qualified engineer or surveyor. Cut sheets shall consist of the following information:
  - 1) Temporary bench marks at each manhole.
  - 2) Each downgrade manhole is to begin with station 0+00 to readily identify the station of each service connection.
  - 3) Where the County is participating in the cost, elevations on centerline cuts are required every 25 feet.
  - 4) Centerline elevations every 50 feet and at every valve box and manhole location for water line projects where cut sheets are permitted and for force main projects.
  - 5) For water designs only, stationing shall be the same as used for the new road.
- D. The Contractor shall be required to have all erosion and sediment control measures in place and approved before beginning clearing or construction.
- E. The Contractor is reminded of the requirements of permits issued by Chesterfield County, the Virginia Department of Transportation and other agencies and the obligation that the requirements of these permits be strictly adhered to.
- F. The Contractor is reminded that prior to the installation of water mains, the design engineer must certify in writing that:

- 1) All pavement and shoulder areas within the right-of-way are graded to within 6" of subgrade.
  - 2) All ditches and slopes to 1 foot outside the right-of-way have been graded to final grade.
  - 3) Markers for the sewer laterals are visible.
  - 4) All necessary property pins have been installed.
- G. It shall be the responsibility of the Developer or his agent to acquire offsite easements necessary for water or sewer installation. Developer shall adhere to any agreements negotiated with the landowner regarding restoration of the easement.
- H. Contractor will not be allowed to remove the pre-assembled flushing mechanism and make the tie-in to the existing water system until all water and sewer utility work, including punch list items, are completed.
- I. Any work performed outside the boundary of a new subdivision and/or site development shall be considered work which the Developer, Engineer, and/or Contractor must comply with other requirements not covered in Part IV that are applicable such as the following sections:
- 1) PART III, Section 1 - Site Clearing
  - 2) PART III, Section 2 - Site Demolition
  - 3) PART III, Section 3 - Erosion and Sediment Control
  - 4) PART III, Section 7 - Establishing Vegetation
- J. The following specifications cover the construction of developer projects:
- Section 1 - Trenching, Backfilling and Compaction  
Section 2 - Sanitary Sewer Systems  
Section 3 - Water Distribution Systems
- These specifications are to be used in conjunction with the County's Standard Details, county's approved materials list and materials specification, and where applicable, any specifications and requirements as set forth in Part III - entitled "County Water and Sewer Projects Construction Specifications".
- K. No one other than appropriate Utilities Department employees will be allowed to operate any valve that is part of the Utilities Department system. This includes all valves that become part of the Utilities Department system after a tie-in has been made.

## 2. **DEFINITIONS:**

### A. **COMPLETION:**

Completion of work indicates that all sewer pipe, water pipe,

Tie-ins to asbestos cement pipe shall be made to rough barrel pipe. Tie-ins to the machined section of asbestos pipe will not be permitted. Where asbestos cement pipe couplings have been removed, the machined end of the pipe shall be removed. Abandonment of cement asbestos pipe shall be per state and federal requirements.

Tie-ins involving fittings shall include provisions for temporary blacking until concrete blocking has cured.

All pipe and fittings used for a tie-in are to be swabbed with a 1% chlorine solution prior to connection.

Before a tie-in will be allowed, all new valves, including fire hydrant valves, shall be accessible and verified fully open by the Contractor, unless there are valves designated as "normally closed". Prior to tie-in, the Inspector shall verify that all valves, including fire hydrant valves, are fully open and accessible. Immediately after a tie-in has been made, all valves used during the shutdown shall be verified fully open by the Inspector. All fire hydrants shall be checked by the Inspector to ensure water is available and each hydrant is in working order.



### 3.02 TESTING OF WATER DISTRIBUTION SYSTEM

#### A. Testing Techniques for Water Distribution System:

1. Each properly isolated section of the piping system including all water services shall be subjected to a pressure test of 150 psi, or 1-1/2 times the working pressure whichever is greater, measured at the high point of the system. Maintain this pressure for a minimum of two hours with an allowable leakage as reflected in the Standard Details Section -Part II. Prior to applying pressure to the lines all reaction blocking, and/or mechanical restraints shall have been completed to the satisfaction of the Inspector. As the pipes are being filled, all air shall be expelled from the pipes by providing suitable taps at the high points of the system. After the system is filled, all taps shall be tightly plugged.

Any defects discovered during this test shall be repeated until the results are satisfactory to the Inspector. The Contractor shall provide all equipment and materials and perform all labor necessary to conduct the test. The Contractor shall provide a suitable test pump and properly calibrated gauge or other means for measuring leakage to include, a clean 50 gallon barrel with top cut out, etc., which is satisfactory to the Inspector.

2. The County will furnish the water used for flushing, sterilization and testing without charge. Filling of water line may be performed provided permission has been obtained from the Inspector who will be responsible for coordinating this activity with the County's Operations and Maintenance Section. Contractor is not permitted to operate valves on existing lines.
3. Testing shall be performed in accordance with the AWWA Specifications, latest revision.

### 3.03 DISINFECTION

- #### A.
- Prior to being placed in service, the pipe line and appurtenances shall be disinfected in general accordance with ANSI/AWWA C651-05; AWWA Standard for **Disinfecting Water Mains** and the supplemental procedures as set forth below.

The Contractor or his subcontractors shall be familiar with the procedures and equipment required for disinfecting large diameter water mains. As part of the submittal process the Contractor shall be required to submit a disinfection plan to the Engineer for approval. At a minimum, the Contractor's plan shall address the following:

- Description of chlorination procedure
  - Method of chlorination
  - Method of neutralizing chlorinated water
  - Method of controlling discharge water such that damage from erosion and flooding is prevented.
1. Section 4 of AWWA C651-05 emphasizes six basic procedures in the disinfection process. The procedures are to:
- a. prevent contaminating materials from entering the water main during storage, construction, or repair;
  - b. remove, by flushing or other means, those materials that may have entered the water main;
  - c. chlorinate any residual contamination that may remain, and flush the chlorinated water from the main;
  - d. protect the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures;
  - e. determine the bacteriological quality by laboratory test after disinfection; and
  - f. make final connection of the approved new water main to the active distribution system.
2. Preliminary Flushing:

The main shall be flushed prior to disinfection at a velocity of not less than 2.5 Ft./Sec. unless the owner determines that conditions will not permit the required flow. See Table 1, entitled "Flushing Schedule". Adequate provisions shall be made by the contractor for disposal of flushing water so that no physical or environmental damage results. Contractor will find additional instructions on flushing in the supplemental procedures within this section.

3. Forms of Chlorine for Disinfection:

It is the contractor's responsibility to be familiar with and have available for his employees the "Product Data Safety Sheets" of any products used as a source of chlorine and to provide the proper safety instructions and personal protective equipment to the employees mixing and using materials for disinfection of the water facilities.

a. Acceptable sources of chlorine for disinfection may be obtained from any of the following three sources:

- 1) Liquid sodium hypochlorite (household bleach)
- 2) Liquid sodium hypochlorite (industrial strength)
- 3) Calcium hypochlorite granules

b. Only under extreme conditions and with the written approval of the owner and under the direction of a holder of a State of Virginia Class III (or higher) water works operator's license can chlorine gas, regulated through proper metering equipment, be mixed with water to obtain a suitable disinfecting solution.

c. The direct introduction of chlorine gas (or liquid) from a pressure cylinder into a water line is not safe and shall not be allowed.

d. The use of calcium hypochlorite pills affixed to the interior of water pipe for disinfection shall not be an acceptable form of disinfection.

e. The mixing of a source of chlorine to obtain a suitable disinfecting solution shall be as follows:

- 1) Liquid sodium hypochlorite is supplied in strengths from 5.25 percent available chlorine (commercially available household bleach) to 15 percent available chlorine (industrial strength sodium hypochlorite). A water-sodium hypochlorite solution shall be prepared by adding liquid sodium hypochlorite to water.
- 2) A water calcium hypochlorite solution shall be prepared by dissolving calcium hypochlorite granules containing 65% available chlorine by weight in a pre-determined volume of water to make the desired water-calcium hypochlorite concen-

tration. Disinfection of new mains by water calcium hypochlorite solution shall not be used unless a suction or in-line strainer is available on the solution pump to prevent any undissolved solids from entering the piping. An alternative method of straining the solution to remove undissolved granules may be approved by the inspector on a case by case basis.

- 3) A water-chlorine gas solution may be used only when suitable equipment is available and shall be done under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who has a State of Virginia Class III or above water works operator's license and is properly trained and equipped to handle any emergency that may arise.
- 4) The direct introduction of chlorine gas (or liquid) from a pressure cylinder into a water line is not safe and shall not be allowed.

#### 4. Method of Chlorine Application and Testing:

- a. The continuous feed method of applying the disinfecting solution shall be as follows: Water from the existing distribution system or other approved sources of potable water supply shall flow through an approved flushing mechanism (Standard Detail WAT-6) at a constant, measured rate into the newly-laid pipeline. The water shall be mixed with a chlorine-water solution as prepared above, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration of the water and water/chlorine solution in the pipe is elevated to and maintained at, a minimum of 50 mg/l available chlorine.

Since the forms of preparation for a water sodium hypochlorite or water calcium hypochlorite concentration are a batch process, a method acceptable to the inspector shall be available to replenish the concentration being fed and mixed with the water flow, so there is no interruption of the flow of disinfection solution.

To assure that this concentration is maintained, the chlorine residual shall be measured at intervals not exceeding 2,000 feet and at the end of all branch lines or cul-de-sacs in accordance

with the procedures outlined herein. During the application of the chlorine-water solution, valves, hydrants and any other appurtenances shall be operated in order to be thoroughly disinfected. Chlorine-water solution application shall continue until the entire new main is filled with water having a residual of a minimum of 50 mg/l chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours.

- b. For 36" and larger water lines: Disinfection by the slug method shall be in accordance with AWWA C-651-05, Section 4.4.4.3. A preassembled flushing mechanism shall be used between the supply and the process equipment and the chlorinated main at all times.
- c. The Owner will furnish the personnel and equipment for determining water-chlorine solution strengths and residuals.
- d. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine residual of the water leaving the main is equal to the chlorine residual of the incoming system water. At that time, the new system shall be valued off and bacteriological testing shall begin as indicated in Section 3.03.B. Additional instructions for disposal of the heavily chlorinated water is covered in Section 3.04.E, entitled "Flushing".

B. Bacteriological Tests:

- 1. After final flushing, and before the water main is placed in service, samples shall be collected and tested for bacteriological quality as follows:
  - a. If total chlorine is 1.5 mg/L or less: Begin bacteriological testing at 24 hours after final flush.
    - 1) Test for total and fecal coliform for 2 consecutive days. Both test samples must be less than 1 colony/100 ml.
    - 2) Test for heterotrophic plate count on 2nd day. Test sample must be less than 500 colonies/ml.
  - b. If total chlorine is greater than 1.5 mg/l: Wait 5 days or until residual drops to 1.5 mg/l or less, whichever is sooner, then test.

- 1) Test for total and fecal coliform for 2 consecutive days. Both test samples must be less than 1 colony/100 ml.
- 2) Test for heterotrophic plate count on 2nd day. Test sample must be less than 500 colonies/ml.

Samples shall be collected at least 24 hours apart at intervals determined by the Inspector (not exceeding 2,000 feet apart and at the end of all branch lines and cul-de-sacs) and tested by the County of Chesterfield laboratory and the results submitted to the Owner.

2. Samples for bacteriological analysis shall be collected in approved sterile bottles or bags treated with sodium thiosulfate provided by the County laboratory. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory and disinfection shall be repeated as prescribed above until the samples are satisfactory. Cleaning, disinfection and testing shall be under the direction of the Inspector but remains the responsibility of the Contractor. Water for these operations will be furnished by the Owner, but the Contractor shall be responsible for any cost associated with the loading, hauling, and discharging of the heavily chlorinated water.

### **3.04 SUPPLEMENTAL PROCEDURES FOR DISINFECTING, TESTING, AND FLUSHING**

#### **A. GENERAL:**

1. All work shall be performed in general accordance with AWWA C651-92.
2. The supplemental procedures are developed to compliment the AWWA C651-92 Standard, particularly with respect to flushing, testing and tie-in to the existing water distribution system.
3. These procedures and construction acceptance for final tie-in of a new water main are performance based, predicated on the new construction passing pressure and bacteriological testing. In order to best assure satisfactory bacteriological results, it is essential that all aforementioned preventive and precautionary measures be taken prior to and during construction to protect the interiors of pipe, fittings and valves against contamination. Failure to follow the precautionary measures increases the likelihood of

unsatisfactory bacteriological tests and increases the construction requirements necessary for final acceptance. Refer to AWWA C651-92, Section 4, entitled "Preventive and Corrective Measures During Construction".

4. No contaminated material or any material capable of supporting the growth of microorganisms or causing taste, odor, or other aesthetic water quality concerns shall be used in sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation or sealing gaskets shall be Blue Lube or Slikstyx pipe gasket lubricant. Blue Lube Slikstyx are the only pipe joint lubricant for such use. It shall be kept clean and applied clean with dedicated applicators.

(Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)

5. Table 1, Flushing Schedule gives flushing flow rates and flushing mechanism sizes for water mains 6" through 24" in diameter. Specific flushing schedules for line sizes above 24" will be project and site specific and directions will be given on the project drawings.

B. Filling and Testing Procedures:

1. Connection of the new water main to the existing distribution system for filling and testing shall be through a contractor furnished flushing mechanism as shown on Standard Detail WAT-6 of these specifications and sized as noted in Table 1, entitled "Flushing Schedule". The contractor is to furnish the single gate valve, double check valve flushing assembly and all necessary fittings, reducers, increases and sleeves to make the piping connections. A suitable valued piping arrangement for the additions of the water-chlorine solution is to be available on the new line side of the flushing assembly. The assembly is to be furnished with 125 psi rated flange connections and installed in a manner approved by the Inspector.
2. Initial flush time is to be in accordance with Table 1, entitled "Flushing Schedule".
3. Pressure test the line as noted in Section 3.02, A.1 of these specifications.

4. Make any necessary repairs and pressure test again until the line passes this test.
5. Disinfect the line in accordance with AWWA C651-92, Section 5. A water-chlorine solution prepared in accordance with Section 3.03, A.3 above shall be used for disinfection.
6. Bacteriological samples will be taken by the County in accordance with AWWA C651-92, Section 7.
7. If unsatisfactory bacteriological test results are received, repeat steps 2, 5 and 6. Where only an unsatisfactory heterotrophic plate count is received, steps 2 and 6 need only be repeated at existing residuals.
8. After receiving satisfactory bacteriological test results, the contractor shall coordinate with the Inspector the connecting of the new main to the existing system. All connecting pipe and fittings shall be clean and free of debris and shall be swabbed or sprayed with a 1 percent sodium hypochlorite solution before they are installed. The contractor shall tie-in new water lines to the existing water system within 10 working days of successful completion of all bacteriological tests, otherwise the disinfection process must be repeated.
9. Final flush of line to be in accordance with Table 1, entitled "Flushing Schedule".

C. The Disinfection and Supplemental Procedures as covered in sections 3.03 and 3.04 may be modified by the Director of Utilities for site specific problems that do not physically allow for following the normal disinfection procedures. Modified instructions will be given in writing from the Director through the Inspector and will be executed by the Contractor in a manner that does not subject the existing distribution system to undue problems and assures that adequate disinfection and flushing will be given to the new main.

D. The procedure for the disinfection of short leads to fire hydrants and the connector pipe to fire suppression systems/ double check assemblies shall be as follows:

Connector piping, fittings and valves from an existing main to a fire hydrant or to a fire system double check assembly, which does not contain domestic use branches and is equal to or less than eighteen (18) feet in length from the main, may be spray disinfected or swabbed with a minimum 1 percent solution of chlorine just prior to installation, tied-in and



flushed at a velocity of not less than 2.5 ft/sec. Bacteriological sampling will be taken downstream for confirmation. Connections to existing mains must be done within 10 working days of the successful completion of all bacteriological tests; otherwise, the disinfection process shall be repeated.

E. Flushing:

Water for filling the line and flushing will be supplied by the Owner at no cost to the Contractor. Therefore, the use of water for making the new water line available for service will be as follows:

1. Initial Flush:

See Table 1, entitled "Flushing Schedule". This is to be a high velocity flush through all sections of the new line. Since the large volume of water may have effects on the existing distribution system, the initial flushing is to be done only with the approval of and under the direction of the Inspector. System demands may cause this flushing to be done at times when the existing distribution system demands are low.

Because of the large volume of water to be flushed from the fire hydrants or flushing hydrants, the Contractor must inspect the areas of discharge and provide the necessary equipment or materials to prevent any environmental damage or erosion. Sufficient hose length and termination fittings are to be provided so as to discharge the water into stable, heavily vegetated areas, drainage ponds, storm sewers, paved ditches, etc. The contractor is to be responsible for any damage that may result from flushing.

2. Flush to remove disinfecting solution:

This is a low velocity, low flow, flush through fire or flushing hydrants to remove the disinfecting solution from the new line. In new subdivisions, or in areas where there is an existing sanitary sewer, this discharge may be made into the sanitary sewer system. The Contractor is to provide sufficient hoses to connect from the hydrants to a manhole in a manner that provides a suitable air gap for backflow prevention. In projects where there are no sanitary sewers, the flushing of the disinfecting solution must not enter any streams or be discharged in a manner that causes any environmental damage. For site specific locations the Inspector may require the use of a neutralizing chemical and piping arrangement.

(See drawing WAT-10, in Part II - "Standard Details" of these specifications). The expense of a neutralizing station is the responsibility of the Developer/Contractor. The Engineer shall indicate the need for a neutralizing station on the drawing.

3. Final Flush:

See Table 1, entitled "Flushing Schedule". The final flush is a medium velocity, medium flow flush to clear the line of any chlorine solution used in the tie-in and to provide for fresh water throughout the new lines.

TABLE 1

FLUSHING TABLE			
(Nominal) Main Size	Double Check Valve Single Gate Size (Note 1)	INITIAL FLUSH (Note 2)	FINAL FLUSH (Note 2)
		Min. Flow (gpm)	Max. Flow (gpm)
6"	4"	220	88
8"	4"	400	160
12"	6"	900	350
16"	6"	1500	624
20"	8"	2450	978
24"	12"	3525	1410
30"	Designed by Consultant	5505	2202
36"	Designed by Consultant	7935	3174

- NOTE:**
- 1) See description of "Preassembled Flushing Mechanism" Section II of the specifications, Detail WAT-6.
  - 2) Approximation of flushing flows can be made by using either a pitot tube or a method of measuring the static discharge pressure from a hydrant used for discharge of the flushing water. See Section II of these specifications, WAT-9 "Discharge Table for Hydrants".
  - 3) On a case by case basis, dependent upon such variables as length of new waterline (<200'); space limitations; or other unforeseeable obstacles, the inspector may authorize the use of a smaller flushing device if the use of this device will provide for adequate flushing of the new waterline.

### 3.05 TESTING OF DOUBLE CHECK ASSEMBLY

- A. The County Inspector will be responsible for insuring the appropriate test is performed up to the OS&Y gate valve located on the inlet side of the double check assembly.
- B. The Fire Department will be responsible for insuring the appropriate tests are performed from the OS&Y gate valve located on the inlet side of the double check assembly to the building including the sprinkler system.
- C. The Developer is responsible for having the double check assembly tested by an approved tester prior to service being authorized to the building. Tests on the double check assembly will be conducted on an ongoing basis annually by a certified tester approved by the Cross Connection Control and Backflow Prevention Office of the Chesterfield County Department of Public Utilities. The results of the test will be sent to the Backflow Prevention office and forwarded to the proper departments.

### **3.06 ABANDONMENT OF WATER SERVICE**

Excavate at the main and expose the corporation stop. Turn off the corporation stop and disconnect the copper tubing from the corporation stop. Assist the Inspector in referencing the location of the corporation stop for County records. Remove the meter box, yoke and service line. The Inspector will turn in the meter to the Operations and/or and Maintenance Center. When existing water services are to be abandoned as a part of a utility project, the Utility Contractor shall review the scope of the work with the Utilities Inspector and then proceed to abandon those services prior to any other work commencing.

### **3.07 ABANDONMENT OF WATER MAINS**

Water mains and hydrant laterals to be abandoned shall be permanently disconnected from the remaining system. If the abandonment takes place at a tee, the tee shall be removed from the main and straight pipe installed. For other instances involving fittings, the proper fitting shall be installed to eliminate the previous connection.

All open ends on abandoned pipe to be permanently sealed by plugging with masonry and/or mortar or plug. All valve boxes, fire hydrants, flushing hydrants (blow-offs) or other appurtenances to be removed. Salvageable fire hydrants are to be returned to the County's Utilities Operations & Maintenance Section.

### **3.08 CLEAN-UP**

Upon the completion of the installation of the water system and prior to the owner's final acceptance, sediment and debris shall be removed from the system. The work area shall be restored to its original condition and pavement replaced to the satisfaction of VDOT and/or County.

End of Section

PART V

ADDENDUM PAGES

12/1/06

## PART V

### APPROVED MATERIALS AND MANUFACTURERS LIST AND MATERIAL SPECIFICATIONS CHESTEFIELD COUNTY, VIRGINIA

**INSTRUCTIONS for viewing and/or printing this document:**

**Click on PART V above to view or print this portion of the specifications. Each section has been set up with bookmarks making it more convenient to locate various topics within the document. After pulling up the section you wish to view or print, click on “BOOKMARKS” in the left hand margin of the document. (When printing the document, please remember to print this table of contents and include it in your book.)**

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	Ultra-Corr PVC Sewer (non-pressure) Pipe (24"-36")	V-4-24
	Ductile Iron (gravity or pressure) Pipe	V-4-24
	Pressure Pipe and Fittings	V-4-24
	Pressure Pipe Fittings	V-4-24
	Pressure Polyvinyl Chloride Pipe	V-4-25
	Push-On-Joint & Rubber Gasket	V-4-25
	Cement Mortar Lining	V-4-25
	Exterior Bituminous Coating	V-4-25
2.	Sanitary Sewer Manholes	V-4-25
3.	Sewage Air/Vacuum Break Valves without Bias Mechanism	V-4-27
4.	Sewage Air/Vacuum Break Release with Bias Mechanism	V-4-27
5.	Sewage Plug Valves	V-4-28
C.	Supplemental Specifications	V-4-31



2. Butterfly Valves (For Use on 16" and Larger Lines)
  - a. Mueller - Lineseal III
  - b. DeZurik Baw AWWA
  - c. Pratt's Groundhog Class 150B and Triton HP-250
  - d. M&H Style 4500 (for 16"-24")  
and Style 1450 (for 30"-54")
  - e. Mosser Series 810 & 830
  - f. Rodney Hunt Streamseal (24" and Larger)
  - g. ValMatic American BFV (16" and Larger)
  - h. Milliken Models 510 and 511 (16" and Larger)

**C. Fire Hydrants**

1. Mueller Centurion A-421
2. Kennedy "K81D" (Dual rotated hydrant)
3. M & H Style 929 Reliant
4. U.S. Pipe - Metropolitan 250 (Model 94)
5. Clow Medallion
6. American Darling - Mark 73-2

**D. Meter (Setters) Yokes**

1. For 5/8" Meters:

5/8" x 7" Riser Meter Yoke with one lockwing ball or plug type, full port angle meter stop, with saddle nuts, 3/4" copper tube flare or compression connection inlet and outlet.

- a. Ford

- 1) V71-7W-22-33 (plug type angle stop with copper flare connections inlet and outlet)
- 2) V71-7W-44-33G (plug type angle stop with compression connections inlet and outlet for copper pipe)

4.	Cambridge Brass 1½"	202-H6H6	202-F6F6
	Cambridge Brass 2"	202-H7H7	202-F7F7

**F. Vaults, Precast Concrete** - Requirements and configurations as shown on plans. (For other approved vaults, see "Water Meter Boxes" under Section 1).

1. Americast
2. Tindall Vaults
3. Clear Flow Company
4. Rotondo Precast
5. M&B (Model MB1500BF/WM with only the Ames 2000 series backflow device and Fire Protection Check Valve - Fig. 590F as manufactured by Grooved Sprinkler Company).
6. Bartow

**G. Tapping Sleeve** - Sleeves must conform to County's latest application instructions as specified in Section 4 entitled Materials Specifications.

1. **(Fabricated Steel sleeves)** with Epoxy Coating and Stainless Steel Bolts and Nuts
  - a. Smith Blair Model #622 w/MJ Branch (4"-30")
  - b. J.C.M. Industries #412 ESS (4"-48")
  - c. ROMAC # FTS 420 SS (4"-30")
  - d. Ford FTSC (4"-30") w/SS bolts
2. **(Stainless Steel sleeves)**
  - a. Power Seal - Model 3480 AS and 3480 MJ (6"-24")  
Model 3490 AS and 3490 MJ (6"-24")
  - b. ROMAC SST and SST III (6"-24")
  - c. Ford FAST (6"-24")
  - d. Cascade - Model CST-EX (4"- larger)  
Model CST-SL (4"-24")
  - e. JCM Model 432 (6"-24")
  - f. Mueller H304 (6"-24")
  - g. Dresser Style 630 (6" - 12")
  - h. Smith-Blair Models 662 & 663 (4"-20")
  - i. Mueller H300 (Not to be used on Asbestos Cement and Cast Iron Pipe)

3.     **(M.J. Steel Sleeve)**

- a.     JCM 414 Mechanical Joint
- b.     Smith-Blair Model 623 (4"-48")

4.     **(M.J. Cast/Ductile Iron Sleeve)**

- a.     Mueller (H-615 for 4"-24" on Ductile Pipe and H-619 for 4"-12" C/A Pipe)
- b.     Clow (F-5205)
- c.     American Flow Control - (Model 2800-A for A/C pipe; Model 2800-C for 4"-12" D.I. and PVC pipes; Model 1004 for PVC pipe and 16" and larger D.I. pipe)
- d.     U. S. Pipe D.I. T-9 MJ Sleeve

**H. Resilient Seated Wedge Tapping Valves**

- 1.     American Flow Series 500 Resilient Wedge Valve (for 6"-12" only)
- 2.     Mueller T-2360 Resilient Wedge Valve (for 6"-12" only)
- 3.     American Flow Control - Series 2500 (for 16"-30" only)
- 4.     Kennedy Model #4950 (for 4" and 24" only)
- 5.     Clow Model F6114 (for 16" and 36" only)
- 6.     American R/D - Series 2000 (Resilient Wedge)

**I. Fittings** (Bends, Crosses, Tees and Grade Lok Offset Glands)  
Ductile Iron only

- 1.     D.I. Compact AWWA C153 or D.I./C.I. AWWA C110
- 2.     D.I. Special Coated Compact Fittings AWWA 153

**Couplings** (For pipe sizes 12" and smaller)

- 1.     Cast Couplings (transition or straight)
  - a.     Romac 501 series (long sleeve coupling)
  - b.     Ford #FC2A (long sleeve coupling)
  - c.     Smith Blair (Rockwell) #442 (long sleeve coupling)

5. Cascade - Styles CNS2 (for 12" and smaller pipe), and CDSLDD (large diameter saddles for 16" and larger pipe)
6. Mueller - Model DRS2 (with double straps for 2"-12")

**Q. Pipe Restraints (must be UL Listed and FM Approved)**

1. For PVC Pipe (Sizes up to 12")
  - a. Megalug Series 2000 PV (PVC Pipe - MJ Fittings)  
Megalug Series 1500 (PVC Bell and Spigot Joints)
  - b. Romac Style 611 (PVC Bell and Spigot Joints)
  - c. Uni-Flange Series 1390-C (PVC Bell and Spigot Joints)  
Uni-Flange Series 1500 (PVC Pipe - MJ Fittings)
  - b. Star Pipe - STARGRIP Series 3600 (PVC Pipe - MJ Fittings)
  - c. Mueller - AquaGrip Intergral Restraint System for use on the Centurion Fire Hydrants and Mueller RS Valves
  - d. SIGMA One-Lok Model SLC
  - g. Capital - EZ-PVC
  - h. U.S. Pipe & Foundry MJ Field Lok Gaskets - Series PV & Series Gland (4"-12")
2. For Ductile Iron Pipe -
  - a. EBAA Iron - Megalug 1100 Series (MJ Fittings) All Sizes
  - b. Uni-Flange Series 1400 Block Buster Wedge Action Retainer Glands (MJ Fittings) Sizes 4"-24"
  - c. Uni-Flange Series 1390-C (Bell and Spigot Joints) Sizes 6"-16"
  - d. Star Pipe - STARGRIP Series 3000 (MJ Fittings) Sizes 4"-48" STARGRIP Series 3600 (MJ Fittings) Sizes 4"-12"

- e. Romac - RomaGrip Sizes 4"-12"
- f. SIGMA One-Lok Model SLD (MJ Fittings) Sizes 4"-36"
- g. Capital - EZ-LOK restraint gland (4"-24")
- h. U.S. Pipe & Foundry - Field Lok 350 Gasket for bell and spigot only (4"-24")
- i. U.S. Pipe & Foundry MJ Field Lok Gasket - Series DI & Series Gland (4"-12")

**R. Markers**

- 1. For All Types of Pipes
  - a. 66" Carsonite White Utility Marker Post with two (2) factory applied decals (#CW-112 or #CWV-116, whichever is applicable; and Stock #P-101 decal)
  - b. Greenline Markers - Model #'s FLU1WH66 and DSU1WH66 with factory applied decals 159A, 029A or 094A, whichever is applicable in Chesterfield County.

**S. Flushing Hydrants**

- 1. Gil Industries 2" Aquarius "One-O-One" HH (Chesterfield Type)
- 2. Kupferle 2" Main Guard Model #78 (Chesterfield Type)

**T. Double Check and Double Detector Check Devices (U.L. classified or F.M. Approved, AWWA compliant and ASSE listed 1015 for DC's and 1048 for DDC's)**

<u>Manufacturer</u>	<u>Model #'s</u>	<u>Size</u>
Ames Co., Inc.	2000SS	4" - 10"
	2000DCA	4" - 8"
	2000SE	8"
	3000SS	4" - 10"
	3000DCDA	4" - 10"
	3000SE	8"
	200A Colt Series	2½" - 10"
	300A Colt Series	2½" - 10"
Cla-val Co.	D	2" - 10"
	16DDC	3" - 10"

Conbraco Industries, Inc.	40-10A		4"
	4060A02		4"
	4060C02		6"
	40-10C		6"
	4010E02		8"
	4010G02		10"
	4S100	2½"	- 6"
	40100	2½"	- 10"
Febco	805 YD	3"	- 10"
	806 YD	3"	- 10"
	850	2½"	- 8"
	856	2½"	- 8"
	870 (V)	2½"	- 10"
	876 (V)	2½"	- 10"
Hersey Products	DDC11	3"	- 10"
	No. 2	3"	- 10"
	FDC	¾"	- 2"
	HDC	¾"	- 2"
Watts Regulator Co.	007	½"	- 3"
	007DCDA	2"	- 3"
	700	3"	- 4"
	709	3"	- 10"
	709DCDA	3"	- 10"
	770DCA	4"	- 10"
	770DCDA	4"	- 10"
	774DCA	4"	- 10"
	774DCDA	4"	- 10"
Zurn Industries, Inc. (Wilkins)	550	3"	- 6"
	MX-550	6"	- 10"
	MX-DCDA	6"	- 10"
	350	2½"	- 6"
	350DA	4"	- 6"
	450	4"	- 6"
	450DA	4"	- 6"
	950	2½"	- 10"
	950 LF	¾"	- 4"
	950 DA	2½"	- 10"
	950 XL	¾"	- 2"

**U. Reduced-Pressure Principle Zone Devices (U.L. classified or F.M. approved, AWWA compliant and ASSE listed 1013)**

<u>Manufacturer</u>	<u>Model #'s</u>	<u>Size</u>
Ames	4000 RP	4" - 10"
	4000 SS	3" - 10"
Cla-val Co.	RP-2	¾" - 1½"
Conbraco Industries, Inc.	40-200	3"
	40-20A	4"
	40-20C	6"
	4020E02	8"
	4020G02	10"
	40200	2½" - 10"
Febco	6C-M	3" - 10"
	FRPII	¾" - 1½"
	825 D & YD	3" - 10"
	860	2½" - 8"
	880 (V)	2½" - 10"
Hershey Products, Inc.	6	4" - 10"
	6C	4" - 10"
Watts Regulator Co.	900	3" - 6"
	909	3" - 10"
	009RP	3"
Zurn Industries, Inc. (Wilkins)	375	2½" - 6"
	375DA	4" - 6"
	475	4" - 6"
	475V	4" - 6"
	975	2½" - 10"
	975DA	2½" - 10"

**V. Casing Spacers**

1. Cascade
2. Advance                      Model SSI
3. PSI                              Model No. C8G-2              Model No. C12G-2
4. Power Seal                      Model No. 4810
5. BWM                              Model BWM-SS
6. CCI                                Model CSS

**W. Lubricants**

1. Blue Lube
2. Slikstyx (new product formulation only)

**X. Water Sampling Stations**

1. GIL # EH101

**Y. Valve Key Extensions**

1. Chesterfield Model (See Detail in Part II of this manual)



5. American Flow Control, (205) 325-7856  
(Formerly American Darling)  
2930 N. 16th. Street  
P.O. Box 2727  
Birmingham, AL 35202-2727
6. U.S. Pipe & Foundry Co. (205) 254-7215  
Valve & Hydrant Products  
P.O. Box 10406  
Birmingham, AL 35202
7. American R/D, LLC (203) 744-0753  
36 Mill Plain Road, Suite 307 FAX (203) 744-0796  
Danbury, CT 06811

## **BUTTERFLY VALVES**

### **MANUFACTURERS:**

1. Mueller Company (804) 320-6278  
500 West Eldorada Street  
P.O. Box 671  
Decatur, IL 62525
2. American Flow Control (205) 325-7856  
2930 N. 16th. Street  
P.O. Box 2727  
Birmingham, AL 35202-2727  
  
American Flow Control (770) 730-9925  
6900 Roswell Road Apt. P-4 FAX (770) 730-9985  
Atlanta, GA 30362-0700
3. DeZurik Water Controls (320) 259-2000  
250 Riverside Ave. North FAX (320) 259-2227  
Sartell, MN 56377
4. Henry Pratt Company (708) 844-4000  
401 South Highland Avenue FAX (708) 844-4124  
Aurora, IL 60506-5593
5. M & H Valve Company, (205) 237-3521  
A Division of McWane, Inc. FAX (205) 237-8630  
P.O. Box 2088  
Anniston, AL 36202
6. Rodney Hunt Company (508) 544-2511  
Orange, MA 01364 FAX (508) 544-7204

7. CMB Industries, Inc. (559) 252-0791  
A United Dominion Company FAX (559) 453-9030  
P. O. Box 8070  
Fresno, CA 93747-8070
8. ValMatic Valve and Manufacturing Corp. (630) 941-7600  
905 Riverside Drive FAX (630) 941-8042  
Elmhurst, IL 60126
9. Milliken Valve Co. (610) 861-8803  
2625 Brodhead Road Suite 100 FAX (610) 861-8094  
Bethlehem, PA 18020-9081

## **TAPPING SLEEVES**

### **MANUFACTURERS (Fabricated Steel and Stainless Steel Sleeves):**

1. JCM Industries, Inc. (800) 527-8482  
P.O. Box 580  
Nash, TX 75569
2. Smith-Blair, Inc. (501) 773-5127  
P.O. Box 5337 (800) 643-9705  
Texarkana, TX 75505 FAX (800) 648-6792
3. ROMAC Industries, Inc. (800) 426-9341  
1064 4th Avenue S.  
Seattle, WA 98134
4. Power Seal Pipeline Products Corp. (817) 767-5566  
P.O. Box 2014 (800) 800-0932  
Wichita Falls, TX 76307 (205) 237-3521
5. The Ford Meter Box Company, Inc. (219) 563-3171  
775 Manchester Avenue FAX (800) 826-3487  
P.O. Box 443  
Wabash, IN 46992-0443
6. Cascade Waterworks Manufacturing, Inc. (312) 553-0840  
1213 Badger (800) 426-4301  
Yorkville, IL 60560 FAX (312) 553-0181
7. Mueller Company (804) 320-6278  
500 West Eldorado Street, P.O. Box 671  
Decatur, IL 62525
8. Dresser Industries, Inc., DMV Division (814) 362-9200  
410 Fisher Avenue FAX (814) 362-9333  
Bradford, PA 16701

## **COPPER TUBING**

### **MANUFACTURERS:**

1. Wolverine Tube (205) 353-1310  
P.O. Box 2202  
Decatur, AL 35602
2. CERRO Copper Products (618) 337-6000  
P.O. Box 91849  
Chicago, IL 60693
3. Cambridge Lee Industries (800) 241-3255  
P.O. Box 81349  
Atlanta, GA 30366
4. Mueller Brass Company (313) 987-4000  
1925 Lapeer Avenue FAX (313) 987-6946  
Port Huron, MI 48060

## **VAULTS AND/OR METER BOXES [for 1 1/2" and larger water meters and assemblies (WM) and for backflow devices (BF)] - PRECAST CONCRETE**

### **MANUFACTURERS:**

- |               |  |
|---------------|--|
| WM<br>(1"-2") | 1. Lyttle Service Co., LLC (804) 231-3426<br>T/A Stamie E. Lyttle Company<br>2210 Belt Blvd., P.O. Box 24205<br>Richmond, VA 23224   |
| WM,<br>BF     | 2. Americast, (800) 548-4586<br>A Division of Valley Blox, Inc.<br>P.O. Box 432, 210 Stone Spring Road<br>Harrisonburg, VA 22801<br><br>Americast, (804) 798-6068<br>A Division of Valley Blox, Inc.<br>11352 Virginia Precast Road<br>Ashland, VA 23005 |

BF	3.	Tindall Concrete Products, Inc. 3076 N. Blackstock Rd., P.O. Box 1778 Spartanburg, SC 29304	(800) 849-4521 (864) 576-3230 FAX (864) 587-8828
BF	4.	The Clear Flow Company P.O. Box 1467, 1321 N. Delphine Ave Waynesboro, VA 22980	(540) 949-8386 FAX (540) 885-3280
BF	5.	Rotondo Precast A Division of Old Castle Precast 5515 Massaponax Church Road Fredericksburg, VA 22407	(540) 898-6300 FAX (540) 898-2389
WM (3" & 4") BF	6.	M&B Concrete Products Inc. P.O. Box 2250 Chester, VA 23832	(804) 748-5557 FAX (804) 748-5557
WM, BF	7.	Bartow Precast P.O. Box 20067 Cartersville, GA 30120	(770) 382-4462 FAX (770) 382-4480 Web Site: <a href="http://www.bartowprecast.com">www.bartowprecast.com</a>

#### **METER BOXES (for 5/8" and 1" water meters)**

##### **MANUFACTURERS:**

##### **POLYETHYLENE**

1.	Mid-States Plastics, Inc. 280 Midland Trail Mt. Sterling, KY 40353	(800) 444-7615 (606) 498-7615 FAX (606) 498-7919
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##### **CAST IRON**

1.	Capitol Foundry of Virginia, Inc. 2856 Crusader Circle Virginia Beach, VA 23456	(804) 427-9431 <u>Mailing Address:</u> P.O. Box 2212 Va. Beach, VA 23452
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#### **SERVICE SADDLES**

##### **MANUFACTURERS:**

1.	ROMAC Industries, Inc. 1064 4th Avenue S. Seattle, WA 98134	(800) 426-9341
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**C. MANUFACTURERS' REPRESENTATIVES AND/OR SUPPLIERS**

1. A & C Utilities Supply Company (804) 743-1980  
9501 Burge Avenue FAX (804) 743-3380  
Richmond, VA 23237
2. A.E.W. Enterprises Utility Pipeline Supplies  
480 Collegeville Road (215) 489-7007  
Collegeville, PA 19426 FAX (215) 454-9528
3. AVS Associates, Inc. (301) 833-7676  
P.O. Box 270 (800) 537-0761  
Glyndon, MD 21071
4. Americast, A Division of Valley Blox, Inc. (800) 548-4586  
P.O. Box 432  
210 Stone Spring Road  
Harrisonburg, VA 22801  
  
Americast, A Division of Valley Blox, Inc. (804) 798-6068  
11352 Virginia Precast Road  
Ashland, VA 23005
5. Aqueous Sales, Inc. (804) 379-0019  
13630 Hailsham Circle FAX (804) 794-7499  
Midlothian, VA 23113
6. Chowning Sales Company (804) 270-2349  
9503 Bonnie Dale Road  
Richmond, VA 23229
7. Coastal Products Company, Inc. (804) 550-0395  
10962 Richardson Road, Suite F FAX (804) 550-0951  
Ashland, VA 23005 E-Mail: Coastal Pro@aol.com  
Attn: Les Thorpe
8. Concrete Specialities, Inc. (703) 982-0777  
1420 16<sup>th</sup> Street N.E. FAX (703) 982-0775  
Roanoke, VA 24014
9. Flomec, Inc. (804) 794-6300  
10821 Trade Road FAX (804) 794-3564  
P.O. Box 35610  
Richmond, VA 23235-0610

**C. MANUFACTURERS' REPRESENTATIVES AND/OR SUPPLIERS (Continued)**

10. HD Supply (804) 743-8010  
2101 Pine Forest Drive FAX (804) 520-5496  
Colonial Heights, VA 23834  
(formerly Hughes Supply)
- or
- HD Supply (804) 749-8281  
2388 Lanier Road FAX (804) 749-4023  
Rockville, VA 23146 Toll Free (800) 474-3878  
(formerly National Waterworks, A & P, WaterPro, and U.S. Filter)
11. Hanson Pipe and Products, Inc. (804) 233-5471  
2900 Terminal Avenue  
Richmond, VA 23234
12. Hockett and Associates, Inc. (804) 353-1423  
1717 Summit Avenue  
Richmond, VA 23230
13. Lewis Supply Co., Inc. (804) 232-7801  
101 E. 7th. Street  
Richmond, VA 23234
14. MAS Sales, Inc. (919) 996-7770  
P.O. Box 1308  
Kernersville, N.C. 27285-1308
15. Paramount Agency (757) 498-9029  
397 W. Farmington Road FAX (757) 431-9132  
Virginia Beach, VA 23454
16. Preferred Sources, Inc. (804) 271-4067  
9303 Burge Avenue FAX (804) 271-1028  
Richmond, VA 23237
17. Reams & Associates 385-7207  
3704 Old Forest Road, Suite E Alt# 385-7842  
Lynchburg, VA 24501 FAX 385-7983
18. Soter-Martin & Assoc., Inc. (804) 798-1423  
P.O. Box 15233  
Richmond, VA 23227

- |     |  |  |
|-----|--|--|
| 19. | RFS & Associates, Inc.<br>5401 Flycatchers Court<br>Warrenton, VA 20187                              | (540) 428-4440<br>FAX (540) 428-4442                   |
| 20. | SPC Marketing<br>P.O. Box 675<br>Monroe, NC 28111  | (704) 283-8554<br>FAX (704) 283-8010                   |
| 21. | Tindall Concrete Products, Inc.<br>3076 N. Blackstock Road<br>P.O. Box 1778<br>Spartanburg, SC 29304 | (800) 849-4521<br>(864) 576-3230<br>FAX (864) 587-8828 |
| 22. | USA - Utility Sales Associates<br>P.O. Box 1168<br>Midlothian, VA 23113                              | (804) 794-4710<br>FAX (804) 794-1397                   |
| 23. | Water Works Supply<br>8338 Old Richfood Road<br>Mechanicsville, VA 23111                             | (804) 730-9050   |

- 6) Seating shall use compression closure. The gate shall be of a true bi-directional, mirror image design.
- 7) Valves shall have a smooth bottom design.
- 8) Valves shall have a port in the bottom of the gate to allow purging of the gate.
- 9) All valves shall open left and have end connections of Mechanical Joint, or as specified by the Department of Public Utilities.
- 10) All castings shall be clean and sound without defects. The castings shall be clean and perfect without blow or sand holes or defects of any kind. No plugging, welding or repairing of cosmetic defects will be allowed.
- 11) Valves 3" through 12" must have a minimum 200 psi working and 400 psi test pressure.
- 12) If the standard valve provided by a Manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each valve must be permanently marked to indicate the option or options that have been provided. The method of marking valves to indicate that options are included must be approved by the Product and Design Review Committee.
- 13) All bonnet bolts must be stainless steel.
- 14) All internal and external bolts shall be a minimum Type 304 stainless steel.

b. Resilient Seated Wedge Tapping Valves:

- 1) Tapping valves shall meet above specifications as referenced in 2.a. above. The outlet end shall be suitable for use with the type of pipe specified, either M.J. or Hub end.
- 2) Tapping valves will be suitable for use with all approved manufactured tapping sleeves without modification.



3. **Butterfly Valves - 16" - 72" - All butterfly valves shall conform to the latest revision of AWWA Standard C-504, Class 150-B unless otherwise indicated and meet the following:**
- a. Valve bodies shall be cast iron, ASTM A-126 Class B or ductile iron per ASTM A-536 grade 65-45-12. Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125 or mechanical joint in accordance with AWWA Standard C-111 or ANSI A21.11. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets and glands), and is for underground use only. All valves shall conform with AWWA C-504, Table 3, Laying Lengths For Flanged Valves and Minimum Body Shell Thickness for all Body Types.
  - b. Valve disc shall be cast iron, ASTM A-126 Class B or ductile iron ASTM A-536, grade 65-45-12. Valve disc shall be of the offset or symmetrical design providing 360 degree uninterrupted seating, and for sizes 24" and larger shall be of the flow through type, cored, or domed.
  - c. The resilient seat shall be natural rubber or BUNA-N located on the disc or the body retained by an epoxy backing ring or 18-8, Type 304 stainless steel retaining ring secured to the disc by 18-8, Type 304 stainless steel screws. The seat shall be capable of mechanical adjustment in the field and field replaceable without the need for special tools on 24" and larger valves. Valve body seat shall be 18-8, Type 304 Stainless Steel.
  - d. Valve shaft shall be 18-8, Type 304 stainless steel. Valves shall have either one piece (through shaft) or two piece (stub shaft). The shaft should be attached to the disc by means of O-ring sealed taper pins with lock nuts on 30" and larger valves. Taper pins should be either 304S.S or 416S.S heat treated for added strength or shaft is attached with stainless steel shaft journals hexmated to drive shaft.
  - e. The valve assembly shall be furnished with a non-adjustable factory set thrust bearing designed to center the valve disc at all times.
  - f. Shaft bearing shall be contained in the integral hubs of the valve body and shall be of non-cold flowing phenolic backed, PTFE or corrosion resistant self-lubricated sleeve type.

- g. Valve shaft seal shall consist of O-rings or Split-V ring. Where the valve shaft projects through the valve body for the actuator connection, the O-ring or Split-V ring packing seal shall be field replaceable as a part of a removable bronze cartridge, without valve disassembly. Connection to the actuator shall be provided by means of at least 2 bolts for 16" - 24" valves and at least 4 bolts for 30" and larger valves.
- h. When manual actuators are required they shall be amply sized for line conditions. All manual actuators should be traveling nut or wormgear type. All 16" through 24" butterfly valve manual actuators shall be capable of withstanding 300-450 foot pounds of input torque against the open or closed stops. All actuators shall have adjustable mechanical stop limits. The closed position stop may or may not be externally adjustable.
- i. All valves shall be coated with AWWA Standard Epoxy Coatings, in conformance to AWWA Standard C-550, latest revision. All interior ferrous surfaces, including disc, shall be coated a nominal 10 mils thick for long life; and body exterior shall have a minimum 8 mils thickness of hand applied epoxy or 3-5 mils thickness fusion bonded epoxy coating in order to provide protection in shipment and storage, and to afford a superior base for field-applied finish coats.
- j. All internal and external bolts shall be a minimum Type 304 stainless steel.

#### **4. Valve Key Extensions:**

- a. The extension shall be one and one half inches (1½") solid core steel with the upper operating nut and bottom coupling welded to the stem.
- b. The 2" square operating nut on top shall be welded to form a complete box with no openings.
- c. 2½" square socket section on bottom shall be tapped on 4 sides for minimum 5/16" N.C. socket head set screws and screws shall be provided.
- d. Valve extensions shall be coated with oil-based enamel or other rust preventative coating.
- e. The operating nut of the valve shall be drilled on opposite sides to allow insertion of the setscrews.
- g. A four and one half inch (4½") diameter steel plate, ¼" thick rock shield, shall be welded to the stem two inches (2") below the bottom of the top operating nut.

**5. Tapping Sleeves:**

**Fabricated Steel:**

- a. The body of the tapping sleeve shall be of 3/8" carbon steel, ASTM grade A285.
- b. Flange to be AWWA C207 Class D ANSI, 150 lb. drilling.
- c. The carbon steel body shall have a 12 mil thick coating of fusion-bonded epoxy. Bolts shall be 18-8, Type 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.

**Stainless Steel:**

- a. The body of the tapping sleeve shall be of 18-8 type 304 stainless steel.
- b. Branch/flange to be 304 stainless steel, 150 lb. drilling.
- c. MJ Gland shall be permanently affixed to the outlet branch and be 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.
- e. Clamping hardware (nuts, bolts and washers) shall be 18-8 type 304 stainless steel, with plastic anti-gall washers. Drop-in bolts or welded-on studs are acceptable.

**Fabricated Steel with Mechanical Joint Ends**

- a. Sleeve body, valve flange, gaskets, hardware and coating to be the same as the fabricated steel tapping sleeve.
- b. The mechanical joint glands to be ASTM-A36 iron or ductile iron.
- c. The gland retaining hardware (nuts, bolts and washers) to be 18-8 type 304 stainless steel.

- 2) The vault shall be watertight. The vault shall be coated on the outside face with a mastic or bituminous coating to prevent infiltration.
- 3) The vault will contain positive drainage. A sump with gravity flow is required if water table problem does not exist. Where water table problem exists, a sump pump is required.
- 4) Pipe penetrations shall be sealed with "Link-seals", a waterproof mastic coating or equal. A clearance of 1"-3" shall be provided around the pipe where the fire line enters and exists the pit.
- 5) Vaults greater than 3.0' in depth will have some type of ladder provided for ingress and egress.
- 6) The entrance hatch to the vault will be a JD-2AL 4'-0" x 4'-0" Bilco door, or approved equal.

b. Valving:

- 1) The double check valve assembly shall be a Watts No. 709 or equal surrounded by an OS&Y gate valve on both the inlet and outlet side of the assembly.
- 2) The Fire Department connection may or may not be located in the vault. The use of post indicating valves, location of the Fire Department connection, and other related fire questions will be addressed by the Fire Department.
- 3) Pipe stands such as poured concrete or fabricated metal shall be provided to support the entire assembly. Metal Pipe stands shall be galvanized or be coated with an acceptable paint to prevent rust. Concrete block or brick is not an acceptable support material.

**7. Fire Hydrants:**

- a. Fire hydrants shall be manufactured in full compliance with this specification and shall also comply with the American Water Works Association Fire Hydrant Specification C-502, latest revision and the following:
  - 1) Type: Compression - Dry Standpipe: Valve shall open against and close with the pressure. The design shall be such that all internal operating parts can be removed through the standpipe and main valve rod extended without excavating.